A Database Publication

THE MICRO USER

Volume 6
Number 10
December 1988
£1.50

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Making a grab for Archimedes screens

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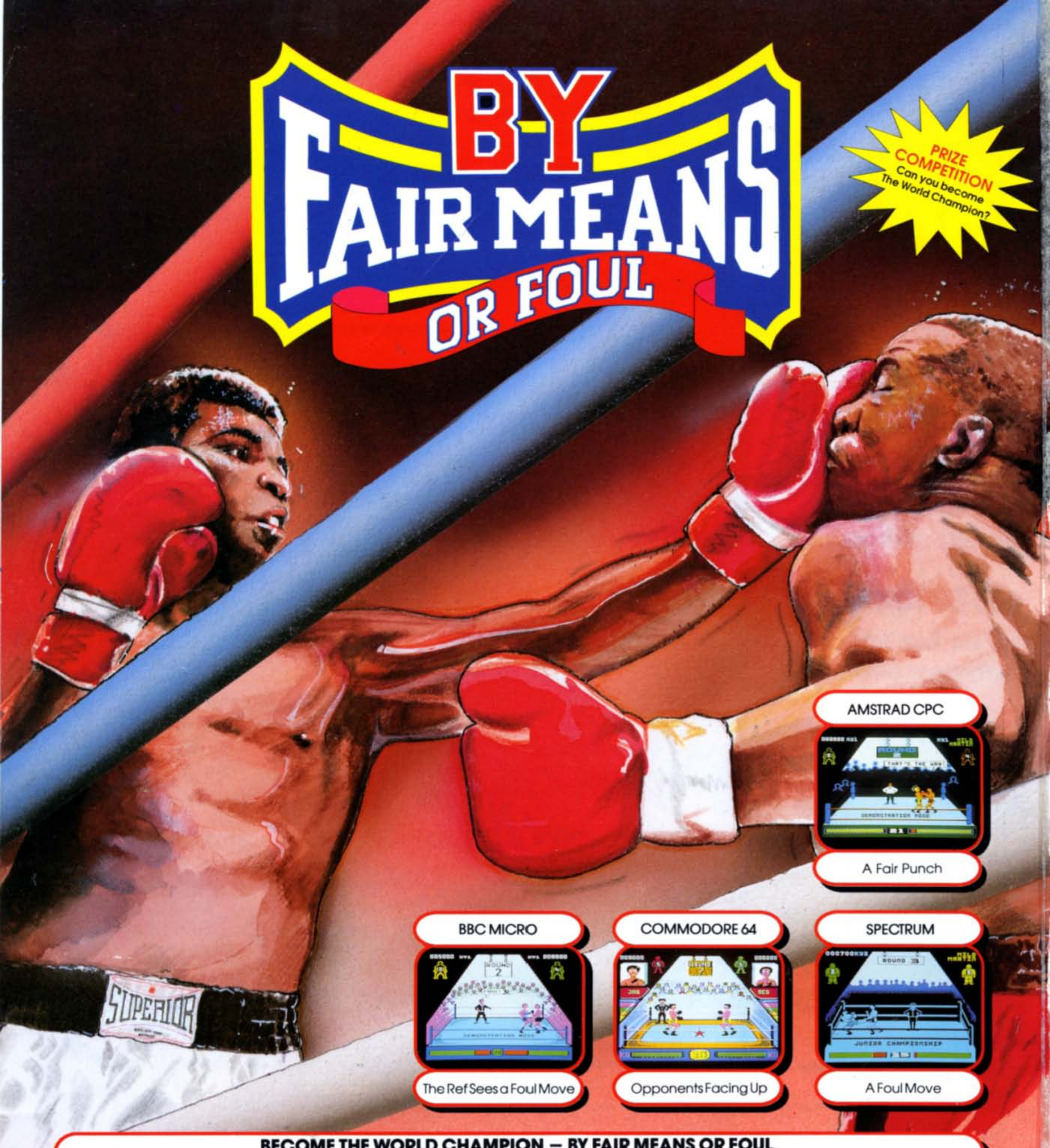
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Cover story

For the first time ever on a BBC Micro magazine, a free games disc that you can play again and again. You can have hours of fun trying to reconstruct the artwork in Clogger: A masterpiece of puzzlement.

And you can now dust off those games you couldn't finish with sample pokes from the fantastic Cheat It Again, Joe discs – all courtesy of *The Micro User* and Impact Software.

Turn to Page 114 to find out what you've got on your free disc.

New Inks

Your chance to save money by using our easy system for re-inking your used fabric ribbons. Not only that, you can revamp them in almost any shade so you can even do colour dumps of your favourite pictures using our superb utilities. Turn to Page 116.

Dial a wizard

Shades, the highly--popular, multi-user online adventure simulation is now available on MicroLink/Telecom Gold as well as Micronet. On Page 57 we reveal some of the mysteries you can find at the other end of your phone.

MICRO USER CLASSIFIEDS

The best bargains in the world of the BBC Micro come from fellow readers of *The Micro User*. Turn to **Page 111** to find just what you're looking for – from cheap modems to complete computer systems.

✓ **For full details of how to use the Checksums, see the article on Page 28 of the February 1988 issue of *The Micro User***

✱ **The Type-it-in symbol indicates that the feature contains at least one full length listing for you to key in on your micro.**

NEXT MONTH

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BEEBUG – The Archimedes Specialists

NEWS beat

Oliver's Arc beats a Cray

A MATHEMATICAL puzzle that took three weeks to crack on one of the world's most powerful mainframe computers was solved by a 16-year-old in only three hours using an Archimedes.

Encouraged by his father, Oliver Riorden from Ealing, London, decided to tackle the Sunday Times competition puzzle set by John Conway – former Cambridge don and currently professor of mathematics at Princeton University.

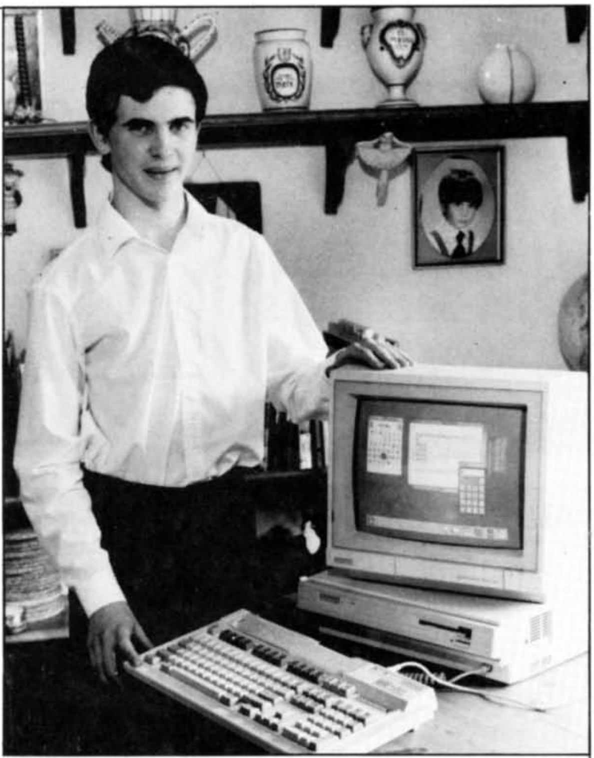
Originally, Conway offered $10,000 to anyone who could find an answer to his challenge at a symposium in New Jersey this summer attended by more than 500 leading American mathematicians and scientists.

Only one – British mathematician Dr Colin Mallows – claimed the prize, and he took three weeks to come up with the answer using a Cray supercomputer.

A keen student of mathematics, Oliver came up with the answer to Dr Conway's challenge – which was to find the point in a number sequence beyond which all numbers when divided by their own place in the series fell within the range of 0.45 and 0.55.

He did it within minutes after writing his own program which divided each number in the sequence by its position, and printing the numbers outside the range. Oliver generated 200,000 terms in order to find the correct answer.

"I know and admire the work of John Conway, particularly his invention The Life Game", said Oliver. "Solving his riddle using the fast processing power of my Archimedes was the easy part. Proving my theory was more complicated and took up most of the three hours".



Oliver Riordan . . . Cray crusher

A pupil at St Paul's School in Barnes, Oliver is studying mathematics, further mathematics, physics, chemistry and music at A Level. A keen programmer, he used a BBC Micro at home before acquiring his Archimedes a year ago.

To mark Oliver's achievement, Acorn Computers has presented him with Archimedes software to go with his prize of a calculator from the Sunday Times.

The Arc goes fax

A PRODUCT which turns an Archimedes into a fax machine is being prepared by Computer Concepts for release before the end of the year.

The Fax Pack modem card will plug into the Archimedes and telephone socket. It will have auto dial, auto answer, send or receive any group 2 or 3 fax, and save on the current filing system as a fax file.

The software will allow character-based output from a variety of word processors to be converted to a fax file format. This will also convert sprites and other graphic files to the same format.

Computer Concepts (0442 63933) is planning two modules – the basic Fax Pack at under £500 and a version with a hand-held scanner and Archimedes interface for around £800.

PCB designer

THE complex and time-consuming process of designing printed circuit board layouts can now be fully automated with the new ARC-PCB design system from Silicon Vision (01-422 2274).

The PCB software – designed specifically for the Archimedes – provides a graphical interface that allows component placement and inter-component routing and editing to be performed interactively.

Fully automatic routing is provided for up to eight layer boards with a maximum design area of 32 square inches and up to 300,000 components.

Part libraries can be created, including surface mount devices, and lines and pad sizes are all fully variable.

Fast zoom, pan and redraw functions speed up design and on-screen help is available.

The ARC-PCB system will drive most leading printers and plotters, including the Plotmate A3, HP-GL, Graphtec and Epson. Prices start at £1,220.

Prestel challenged

OFTEL, the telecommunications watchdog, has revealed it has received a number of complaints about new Prestel charges introduced in the summer.

"They came primarily from home computer users who tend to access the system in the evenings and at weekends", said a spokesman.

"We have asked British Telecom for an explanation of the basis for the new charges and have also raised the question of quality of service, which many complainants say has deteriorated significantly".

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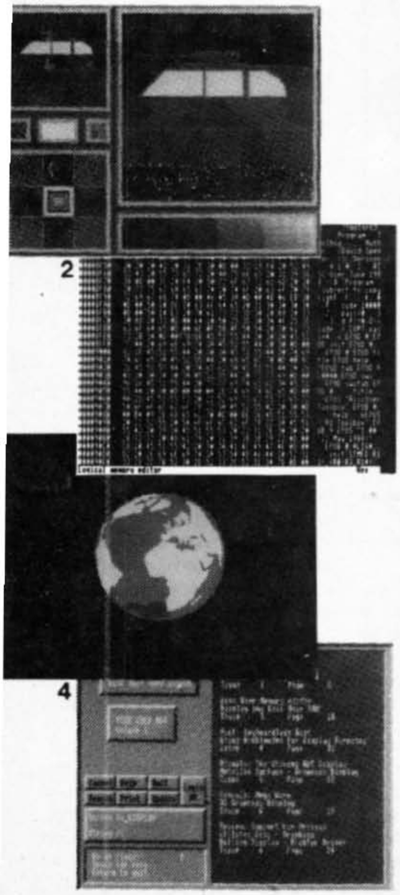

1 Pixel Editor

This powerful drawing tool is a full-screen full-feature pixel editor, for creating and editing screens and sprites.

2 Toolbox

This incredibly useful utility features a memory editor, memory search and replace, disc editor and disassembler. TOOLBOX contains many of the features found in packages costing over £35.

3 World in Motion

A stunning animation with an oddly reminiscent feel to it.

4 Arcscan

A fast on-screen bibliography with powerful search facilities for all the RISC User and BEEBUG magazines published. Normal price £12.

5 Disc Menu Module

Use the mouse to control your disc files with this extremely useful relocatable module.

6 Printer Buffer

This printer buffer frees your computer during long printouts and is configurable from a few bytes to 4 Mbytes. Similar to packages currently selling at £19.

Altogether the items on this disc would be worth over £50 if bought separately.

This is what you've missed in volume1

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All Mode Screen Compressor	5
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Fast Directory Copier	6
Fancy Font Scroller	7
Full Screen Pixel Editor	4
Intelligent Auto-Configure	6
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A Module For Twin	6
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. . . and much more	

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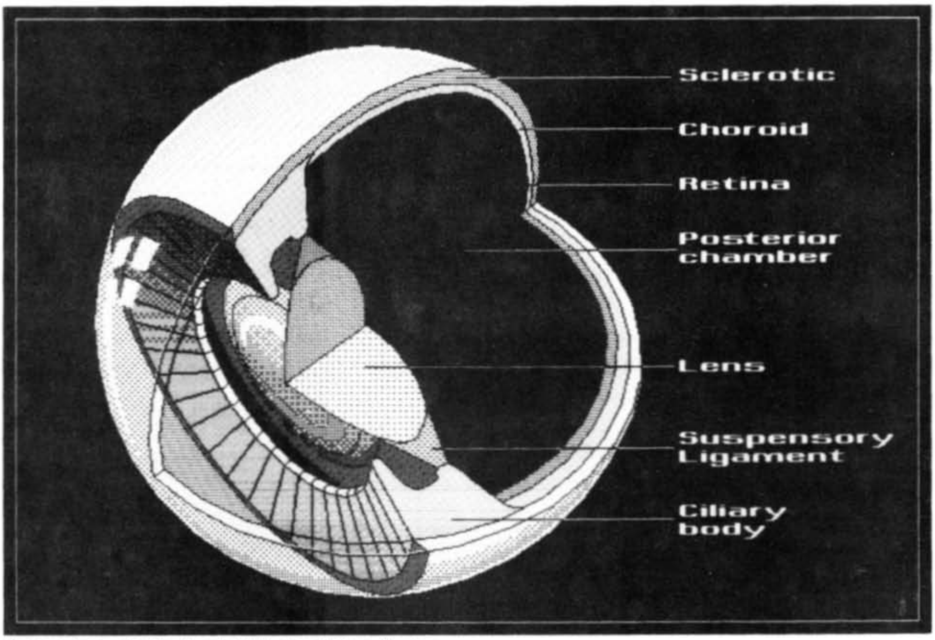


Output from AB Designs' High Resolution System

Masterly challenge to Arc

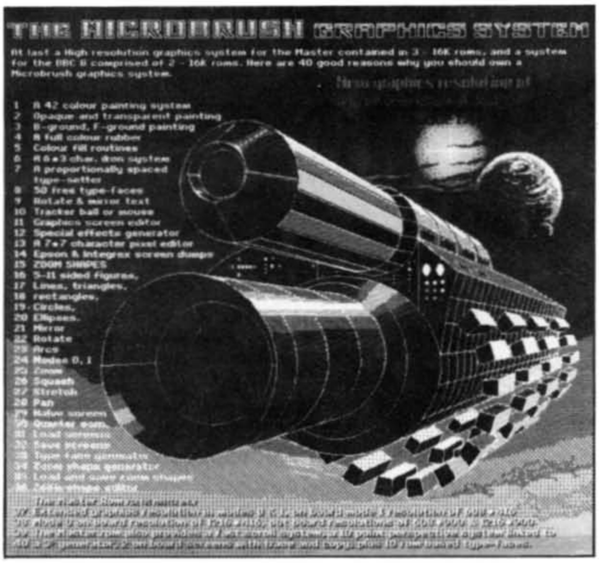
THE BBC Master seems set to steal some limelight from the Archimedes, thanks to a new release from A B Designs (01-644 6643).

The Microbrush High Resolution System is a considerably enhanced version of the company's Microbrush series.

Used in conjunction with an Integrex colourjet printer it can produce images using any 2,400 colours from a palette of more than four million at approximately 16 times the standard resolution of the BBC Master.

This is made possible by the addition of a rom which contains the high resolution system, 10 rom-based typefaces, a 10 point perspective system and a second fill routine.

The rom costs £65 when bought separately, £50 with the other two roms in the Microbrush series.



THE MICROBRUSH GRAPHICS SYSTEM

At last a High resolution graphics system for the Master contained in 3 - 16K roms, and a system for the BBC B comprised of 2 - 16K roms. Here are 40 good reasons why you should own a Microbrush graphics system.

1 A 42 colour painting system
2 Opaque and transparent painting
3 B-ground, F-ground painting
4 A full colour rubber
5 Colour fill routines
6 A 6×3 char. dcon system
7 A proportionally spaced type-setter
8 50 free type-faces
9 Rotate & mirror text
10 Tracker ball or mouse
11 Graphics screen editor
12 Special effects generator
13 A 7×7 character pixel editor
14 Epson & Integrex screen dumps
15 ZOOM SHAPES
16 5-11 sided figures,
17 Lines, triangles,
18 rectangles,
19 Circles,
20 Ellipses,
21 Mirror
22 Rotate
23 Arcs
24 Modes 0, 1
25 Zoom
26 Squash
27 Stretch
28 Pan
29 Halve screen
30 Quarter screen
31 Load screens
32 Save screens
33 Type-face generator
34 Zoom shape generator
35 Load and save zoom shapes
36 Zoom shape editor

Video link

LATEST release from Interactive Media Resources (0902 25444) is a genlock and near broadcast quality PAL encoder for the BBC Master. It allows you to superimpose text and graphics from the micro over a video image. Price £700.

Z88 facts

COURSES for Z88 uses are being organised by Milton Keynes dealer Rakewell (0908 366009). Sessions include tuition on PipeDream, Spell-Master and zBase, plus data exchange between computers. Price £49.

THE 20th Electron & BBC Micro User Show, which opens its doors on November 11 at London's New Horticultural Hall, Greycoat Street, is set to be the brightest yet.

The anniversary is marked by a new feature area – the Wonderful World of Archimedes – which will provide a showcase for all the latest and most innovative products for Acorn's flagship machine.

Lindus International, Ace, Minerva and Colton Software are lined up with major products in this special area, and visitors will have a chance to assess the power and versatility of the Archimedes for themselves.

The Archimedes will also be put through its paces on the Computer Concepts stand, where the Fax Pack modem will be on sale for the first time.

But the rest of the Acorn range is not neglected, and there'll be new products for both the Electron and BBC Micro series from AMS, A B Design, Pres, Ian Copestake Software and many more.

Watford Electronics, itself celebrating an anniversary – 16 years and still going strong – will be showing new hardware and software for both the BBC Micro and Archimedes, and also its new Aries series of PCs.

For the musically minded, Hybrid Technology will be launching a major new package for the BBC Micro, while newcomer Armadillo will have a trio of products for the Archimedes on hand. And Mike Beecher will also be lending a tuneful note to the occasion.

Gamers are not neglected either, with new offerings from Superior, Tynesoft and Impact.

Visitors will also have technical advice on hand from the UK's leading experts on the Acorn range, and can help choose the winners on this year's Micro User Innovation Awards contest.

And with more than 50 exhibitors in attendance at the three day show, there's sure to be something for everyone – and lots of pre-Christmas bargains.

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NEWS beat

More Impact

IMPACT Games (0742 769950), which now claims 300 titles on offer to 10,000 regular buyers, is releasing its own entertainment software.

First title is super-fast shoot-'em-up Quazer for the Archimedes, price £11.95. "We also have a superb one or two player game called Zenon ready for release", said Impact managing director Mark Botterill.

Reprise

A RE-RELEASE of the Audiogenic hit Graham Gooch's Cricket is on its way for the BBC Micro from Alternative Software (0273 561306).

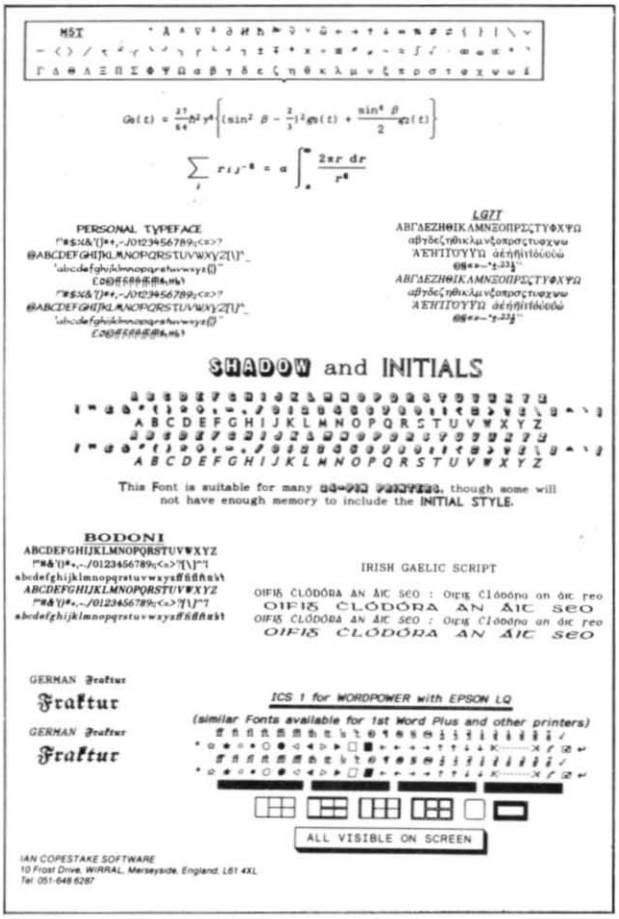
Latest edition

PIXEL Perfect has been completely re-written for the Archimedes by AVP (02912 5439) – and is claimed to be the machine's first true desktop publishing package.

An AVP spokesman said: "The opening screen introduces you to an elegant and uncluttered pull-down menu system which allows you to work on virtually the whole screen, but with immediate access to all parts of the system.

"A text editor is included and all your documents can be imported directly. Single or multiple frame input, wrapping round graphics, left and right justification – the list of ways to import is extensive – and you can create or amend fonts and patterns.

"In addition there is a host of graphics functions to help you create documents like news sheets, worksheets and reports". Price £79.50.



PERSONAL TYPEFACE

LG7T

SHADOW and INITIALS

ABCDEFGHIJKLMNOPQRSTUVWXYZ

ABCDEFGHIJKLMNOPQRSTUVWXYZ

This Font is suitable for many 24-PIN PRINTERS, though some will not have enough memory to include the INITIAL STYLE.

BODONI

ABCDEFGHIJKLMNOPQRSTUVWXYZ

abcdefghijklmnopqrstuvwxyz

ABCDEFGHIJKLMNOPQRSTUVWXYZ

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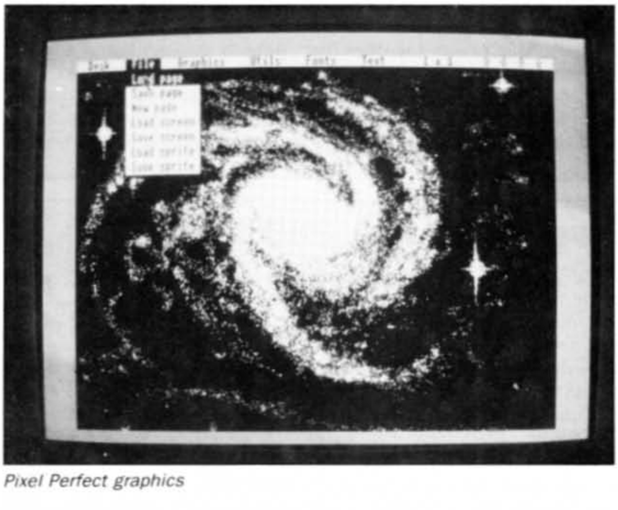


Pixel Perfect graphics

More WP software

IAN Copestake Software (051 648 6287) will be using the 20th Electron & BBC Micro User Show to show its full range of word processing software for the BBC Micro and Archimedes.

Archimedes users of 1st Word Plus will find First Font particularly useful.

Easy to use, the package turns 1st Word Plus into a language and scientific word processor, supporting full use of printer features such as proportional spacing and different fonts.

First Fonts features special character sets for science, languages – including French, German, Spanish and Greek – and stationery design, as well as additional typefaces.

The package supports output to both 9 and 24-pin printers. NLQ quality is provided wherever possible and some printers – such as the Canon PW-1080A – can easily be fitted with a low-cost ram chip for this purpose.

Also on show will be the company's own word processor – Wordpower – which is compatible with all Acorn machines from the Electron to the Compact and which can use both sideways and shadow ram.

A complementary package Power Fonts, which can provide keyboard control and screen display for scientific and linguistic text.

Recommended for use with 9 pin printers, Power Fonts can produce high quality printout with French, German, Russian, Greek, mathematics, physics chemistry and other specialised text. Price £21.85 each.

Wordpower can also be used with the Archimedes 6502 Emulator.

NEWS beat

THE PERSONAL COMPUTER SHOW REPORT

ACORN boasted its largest ever presence at a PC Show, and although overshadowed by its bigger and flashier neighbours from Commodore and Atari, it wasn't dominated.

The reason was an impressive, though low key, demonstration of Archimedes technology, new and not-so-new.

Highlight was the new enhanced multi-tasking Archimedes operating system, Risc OS, shown in all its glory for the very first time.

Integrated word processors, spreadsheets and databases, 3D graphic modelling, desktop publishing, sound and vision, productivity tools, books and compilers were just some of the areas covered by Acorn and guest third party suppliers.

Visitors to the Acorn Theatre were treated to presentations of Acorn's Desktop Publisher, ProArtisan from Clares, EMR's Sound-Graphics-Music show, productivity tools from Minerva, Lingenuity's Presenter and 1st Word Plus, AIM's Eckhord image presentation system, Mitre's Flying Start II and Colton's PipeDream and SpellCheck.

Owners of BBC Micros and Masters had to search elsewhere at Earls Court for products to suit their machines. But they weren't disappointed.

Blue Ribbon sales director Martyn Wilson (left) and Superior's sales manager Ken Campbell shake hands after signing the deal

Superior budget games

VISITORS to the show learned that budget software house Blue Ribbon has obtained the rights to re-publish 15 Superior Software hit games for the BBC Micro. It is the first time Superior has allowed its titles to be published by a budget software firm.

The deal covers some of Superior's biggest selling titles including Repton, Thrust, Codename Droid and Crazee Rider.

Because the project is a joint enterprise the games will be released on a new Blue Ribbon/Superior Software label.

Blue Ribbon sales director Martyn Wilson told *The Micro User*: "This brings together the two best known names in the Acorn games marketplace.

"BBC Micro owners are eager for quality product at a budget price and these games are destined to return straight to the top of the charts".

Superior's managing director Richard Hanson said: "We've been watching the Acorn market for some time and are now convinced the time is right for our games to enter the budget arena.

"We expect to achieve a clean sweep of the BBC Micro chart before Christmas".

The back-to-back BBC Micro/Electron cassettes will cost £2.99 each.

Titles – to be released in groups of four at three-monthly intervals – are Percy Penguin, Mr Wiz, Smash & Grab, Repton, Repton 2, Deathstar, Citadel, Karate Combat, Thrust, Galaforce, Stryker's Run, Ravenskull, Codename Droid, Crazee Rider and Syncron.

More software for the Z88 laptop

THERE was plenty to interest users of the Cambridge Computer laptop.

Spell-Master from Computer Concepts (0442 63933) is a £59 easy-to-use text editor with integrated 60,000 word spelling checker. Text files created using Pipedream can be loaded into the text editor and spelling checked using the quick-edit facility.

On a smaller scale, Wordchip from Harvester Information Systems (01-831 2331) contains 30,000 words and costs £49.95. Also from Harvester comes Data Organiser for simple record keeping, price £39.95.

Due for release at the end of the year, priced £69, zBase database from Wordmongers (0296 437878) has the ability to index data and output files for further processing of business applications.

Extensive software selection

A NEW BBC Micro title that Blue Ribbon (0302 340480) announced at the show was Hi-Q Quiz, price £1.99.

Nick Pearson of AMS (0925 413501) was forecasting the sale in December of the 100,000th AMX mouse and offering a Fortnum and Mason hamper to the lucky purchaser.

There was great interest in the launch of Lancelot by Mandarin Software (0625 878888), not least because the BBC Master – and expanded Model B – adventure game invites players to join the search for a £5,000 bejewelled replica of the Holy Grail. Price £14.95.

Bargains on offer from Bug Byte (01-247 6434) included new release Monkey Nuts for the BBC Micro, price £1.99

Interesting products from PCD Maltron (01-398 3265) were a range of ergonomically designed keyboards for the BBC Micro and Master. They included two and one hand operated models.

Level 9 Computing (0344 487597) launched Ingrid's Back, its hilarious follow-up to Gnome Ranger, price £14.95.

Dabs Press (061-766 8423) displayed an entire library of new products for Archimedes users. These included £99.95 Basic Compiler and £49.95 System Manager software, and the books First Steps, Basic V – £9.95 each – Assembly Language and Operating System – £14.95 each.

New for Z88 owners were £19.95 Advanced User Guide and £14.95 PipeDream Guide..

Latest innovative product from Thingi and Mouse Pad suppliers Little Office (051-666 1190) turned out to be another copy holder.

But this one – Copi Clip – is an injection moulded, ergonomically designed product.

It rotates out of the way when not in use and has a gravity clip for firm grip of the paper being copied. Price £6.99.

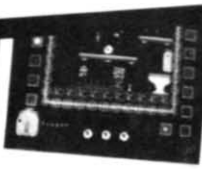
Archimedes Games

£14.95 each

ORION

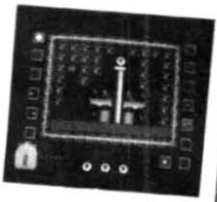
Skillfully manipulate Orion, the latest air to air combat interceptor, to defend your planet against the tide of marauding aliens. Shoot them down before its too late! Score points by saving your men before they are changed into mutants - otherwise they will turn against you. Contains Baiters, Pods which explode into Swarmers and waves of Bombers. Orion is a fast and furious scrolling 'shoot em up' game based on the all time arcade classic.

NEW



HOVERBOD

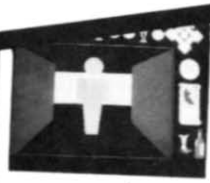
Hoverbod is a traditional maze adventure in the style of the classic Manic Miner, yet it is of stupendous proportions. Hoverbod, the yellow sperical droid, has been banished from the planet Zingle and goes in search of some stolen treasure. The player must guide him through the perils which befall him and help him puzzle his way through the eight different levels to the final quest level. But beware ... the Ibbles and Squibbles start to materialise !!!!



FREDDY'S FOLLY

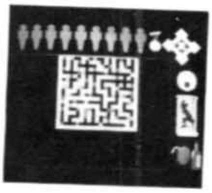
An enchanting game using animated graphics. Just watch the little men load the canon and pull it along. Notice the celebration when they win! Colourful fun for all the family. Sir Freddy is sneaky and envious of your castle so plans to bomb it with a fleet of balloons. You built a battlement to shoot down Sir Freddy in his balloon. Sir Freddy then hired several Gun ships to shoot your canon crew. Defend your castle and shoot down the balloons and the invading ships.

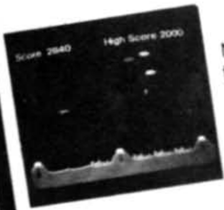
NEW



MINOTAUR

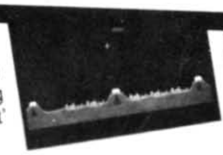
The Minotaur maze game is aimed at a market for children or adults who want a game where quick shoot-out reactions are not necessary. Theseus walks around the Labyrinth, collecting items to assist in the search of the ill fated men which have been provided as food for the Minotaur. The ultimate aim is then to kill the Minotaur and lead the men out of the Labyrinth to safety. The maze size is fully definable by the User. Games may be saved and reloaded for use at a later time.





MISSILE CONTROL

Missile Control is a classic arcade game written for the Archimedes to make full use of the advanced graphics and sound, while remaining faithful to the original concepts of the game. The Player is in control of the cities from the incoming launches and must do the utmost to protect the cities from the 'smart' missiles. On each subsequent attack further planes, satellites or missiles attack the target cities.



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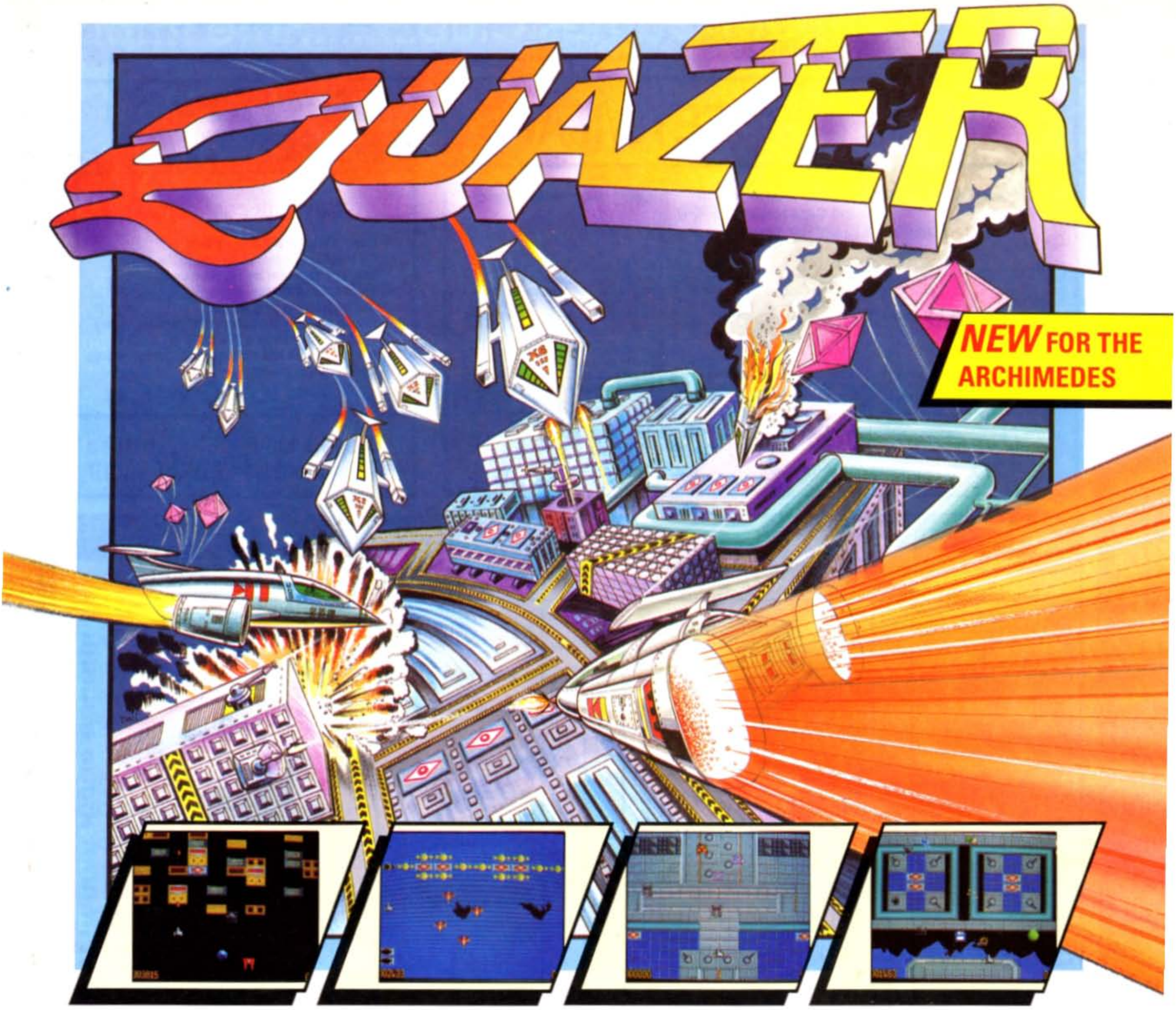

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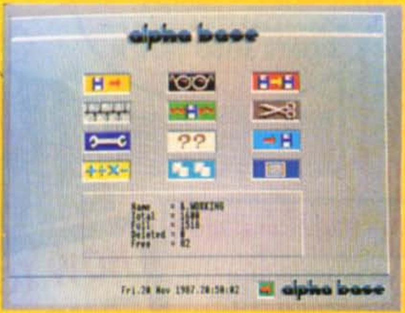

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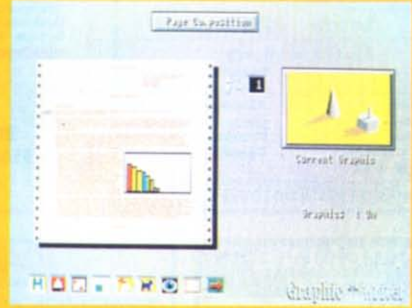

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2	△3	**DARTS** ***Blue Ribbon***	Highest budget game this month. You have three types of darts games to play here: 501, Round the Board and Cricket.	1.99
3	△5	**PRO GOLF** ***Atlantis***	Why not stay in for a quick round of 18 holes with this great little game with all the useful options you'd expect.	2.99
4	▽1	**STEVE DAVIS SNOOKER** ***Blue Ribbon***	This one has been around for years. Should you want to follow in Steve's footsteps it's a cheap way to practice.	1.99
5	●	**EMPIRE STRIKES BACK** ***Domark***	Highest new entry, this is the sequel to Star Wars. You can read our reviewer's opinion in this issue of *The Micro User*.	9.95
6	△7	**SHARK** ***Audiogenic***	Colonel Shark is the only hope against the invaders. A bracing shoot-'em-up, similar to Green Beret but with some nice touches.	9.95
7	▽6	**AIR WOLF** ***Encore***	Another budget shoot-'em-up, this time clearing the skies. Based on the TV series, it is a good game for the price.	1.99
8	◁8	**PLAY IT AGAIN SAM 2** ***Superior***	The highest compilation in the charts featuring Superior's Repton 3, Crazee Rider, Galaforce and Codename:Droid.	9.95
9	△18	**PLAY IT AGAIN SAM** ***Superior***	If you haven't got these old classics then this is your chance to buy: Citadel, Thrust, Stryker's Run and Ravenskull.	9.95
10	◁10	**SAIGON** ***Tynesoft***	A commando game, but you do have the advantage of being in charge of some US marines. The odds are as overwhelming as usual.	9.95
11	△12	**STAR WARS** ***Domark***	The prequel to Empire Strikes Back, you may not want both unless you are particularly hooked by wire-frame graphics.	9.95
12	△14	**WINTER OLYMPIAD** ***Tynesoft***	You will never escape from the Olympics, and if you enjoy the snowy side of sport then fasten on your skis and go for gold.	9.95
13	●	**GOLDEN FIGURINE** ***Atlantis***	A new one from Atlantis – budget priced, but fun and good value. Read a full review in next month's issue.	1.99
14	●	**FIVE STAR GAMES** ***Beau Jolly***	This compilation returns to the charts, again showing that you can't have too much of a good game. Excellent value.	9.95
15	●	**THE HUNT: SEARCH FOR SHAUNA** ***Robico***	Adventure returns to the charts – with graphics and, as usual, an excellent collection of puzzles. A must if you haven't got this already.	9.95
16	●	**STAIRWAY TO HELL** ***Powerhouse***	An interesting play on words in this new title. Worth adding to any collection as Powerhouse is not that prolific.	1.99
17	△20	**QUEST** ***Superior***	Walter Cobra and the Quest for the Golden Dragon is the full title. Follow this little fellow on a graphic adventure.	9.95
18	●	**BONECRUNCHER** ***Superior***	You probably didn't know that soap was so difficult to make, what with collecting skeletons and pleasing a group of sea monsters.	9.95
19	●	**MUSIC SYSTEM** ***Image Systems***	The only non-games title in the charts this month and a superb way to make the most of the musical capabilities of your BBC Micro.	19.95
20	●	**PALACE OF MAGIC** ***Superior***	If you haven't entered the Palace yet this is your chance to do so. Or you could wait to buy Play it Again Sam 3.	9.95

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Word Power (Ian Copestake Software)
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Diagram II (Pineapple Software)
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Animated Titling
DFS Utilities: *FREE and *MAP
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This is just a small sample of the items featured in Volume 6

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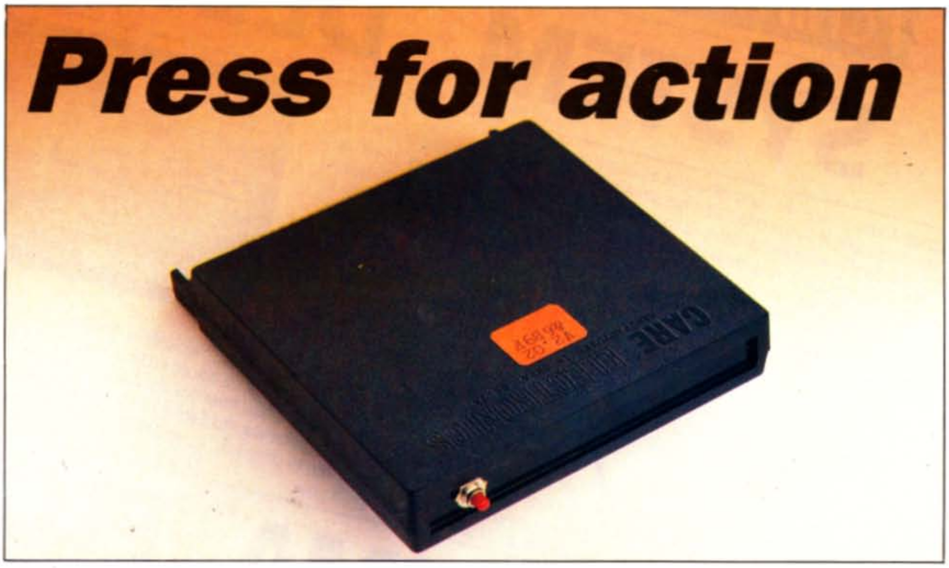


Product: Master Smart Cartridge
Price: £39.79 incl. vat
Supplier: Morley Electronics, Unit 3, Maurice Road Industrial Estate, Wallsend, Tyne & Wear, NE28 6BY
Tel: 091-262 7507

Rory McCloy pushes the button on his bespoke hardware

NO writer of software reviews should be without one – this was my conclusion after only half an hour with this clever add-on. Morley Electronics has added software to a rom cartridge from Care Electronics and come up with a package with no clear rival. The cartridge contains a 16k eprom for the software, and a small ram chip to store the user-defined instructions. There is a miniature push button on the top of the cartridge which activates a previously determined sequence of commands.

Installing and using the Master Smart Cartridge takes seconds and presents no problems. Simply plug it into one of the two slots on the Master, switch on and type *GMENU. Now select a menu letter from A-W, press Escape and that instruction will be activated at each push of the cartridge button whatever the micro is doing at that moment – well almost. Since the Smart Cartridge works via an unrecognised interrupt request, it may not always perform the required task, but it worked every time for me.

I find the most useful utility is one which dumps the screen to a printer. Pressing the button freezes the current program and activates a faster than average screen dump routine which provides a good multitone dump on an Epson-compatible printer. There is also a *GGDUMP command that can be used to call the routine from Basic programs. Graphics dumps work for Modes 0,1,2 and 4 – and corresponding shadow modes – irrespective of whether the Tube co-processor is active or not.

The other modes, including Mode 7 and 135, print out as text dumps. I managed to get screen dumps of frozen action from various games and graphics demonstrations from the Welcome disc first time. While I was impressed with the Morley screen dump, I would have liked some other types such as an inverse dump for a negative version of the screen. And you should remember that only Epson-compatible printers are supported.

A similar utility saves the screen memory to disc or tape with a user-definable filename which is incremented by a suffix letter each time the button is pressed – for example, SCREENa, SCREENb and so on.

Option A saves the entire computer's memory from &0000 to &8000, as well as the shadow ram and some MOS private workspace, in seven files saved with a chosen filename, each suffixed with the letters a-g. Unfortunately, the intructions are too brief – two sides of typed A4 – to give enough details of these files, except that files d and e hold the real and shadow screens.

Option D pauses the micro which can be restarted by pressing any key. Three patch options allow you to enter your own machine code routine – up to 256 bytes long – when the cartridge button is pressed.

Star commands – selected by Morley – can be entered with options H-S. Some are useful, such as *TIME, *ROMS, *CAT. However *FX200, to set normal Break and Escape action, and *FX247, for intercepting the Break vector, are unusual choices.

There is an option to poke a hex value to a chosen memory location which could be useful for game pokes, although if more than one location needs changing it is not much use. Option W will *RUN a machine code program.

A user-defined option can contain up to 20 characters for your favourite star command sequence. This enables the Smart Cartridge to be tailored to your needs. The only minor frustration here is remembering to press a key to exit the Smart interrupt.

This powerful option is only limited by your own ideas, and I would have appreciated more than one page of hints and tips. Your star command could invoke another rom. For example, entering WORD or SHEET into option U will activate View or ViewSheet at the button press, but interestingly – due to interrupt problems, I imagine – I could not get this to work with the Tube co-processor on.

Having had the Smart cartridge and finding what a joy it is to use, my only wish is for one that works on the Archimedes.

The bottom line ...

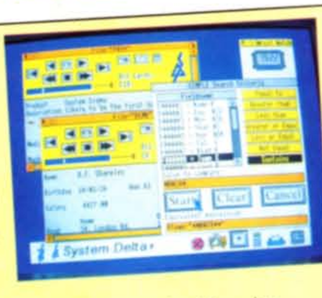
A very wide range of possible uses make this utility live up to its name. A really excellent buy for Master owners.

MINERVA SOFTWARE FOR THE

Archimedes **£69.95 EACH**

SYSTEM DELTA

System Delta is the most comprehensive database available yet. It's so simple to operate that it has already become the standard in educational fields. It is very professional and pleasing in its presentation, making full use of the genuine Archimedes WIMP environment. It can handle vast amounts of data in the office, school or home, with its capacity of 2.14 billion records and 16 million fields. Its multiple 'key fields' allow any record to be found in 1 sec. even in a file of 20,000 records.



It maximises on the Archimedes' speed and has unique multi-tasking allowing an operation to continue on one file whilst performing a search or print on another. Easy file creation using free format screens with eight data types. Multiple display, print and report formats with each file including a user defined label facility. Three methods of search from simple option selection to in-depth multiple criteria, multiple fields or results of formulae. Comprehensive maths facilities allow results to be placed in other fields. Fast sort by any criteria on any number of fields. Transfer fields from one database to another. Imports data from other databases, exports data to Gamma and Sigma. Absolutely no programming required – but if you wish to program or customise then of course, we provide a full set of commands for you.

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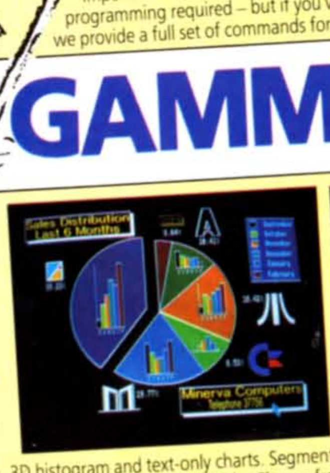
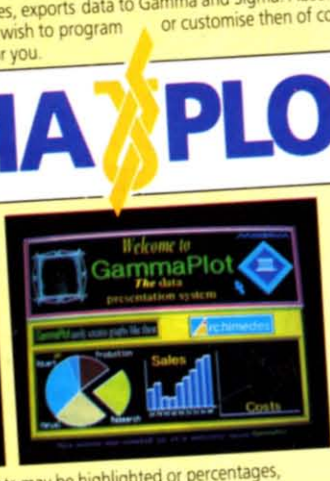
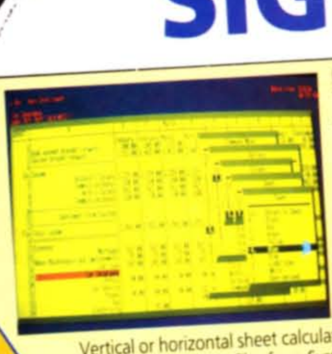




Seeing is believing! GammaPlot is an extensive chart/graph plotting program with a full art package included. It allows even a novice to produce stunning charts and drawings on one screen. Several charts may be placed on one sheet, in any position with text or drawings to make the data easily understood.

GammaPlot supports six main graph and chart types of line, scatter, pie, histogram, 3D histogram and text-only charts. Segments may be highlighted or percentages, values and labels switched on. Statistics are also available. Choose from the text styles supplied or any of the native Archimedes 'pretty fonts' or even define your own, and any of these can be enlarged or reduced. Various shapes, patterns and borders are supplied with a full 256 colour range. Full zoom facility. Various pen types are provided to draw pictures or add signatures. Import digitised pictures or company logos. Print facilities include colour output. Data entry is via the keyboard or any Delta, Gamma or Sigma file.

SIGMA SHEET



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Software for the Archimedes now available on disc...

Computer Concepts is now releasing new low cost DISC versions of its popular INTER-WORD, SHEET, CHART and SPELL-MASTER products for the Archimedes.

Inter-Word has now sold over 30,000 copies, making it one of the most popular products ever released for the BBC. The Archimedes version has several improvements including support for colour, and for the 132 column and 64 line screen modes allowing almost a complete page to be seen on screen at once. The existing features, such as auto formatting, WYSIWYG display and super fast scrolling together with these new enhancements ensure this is still one of the most effective word processors available for the Archimedes.

ARCHIMEDES DISC £29.00 + VAT
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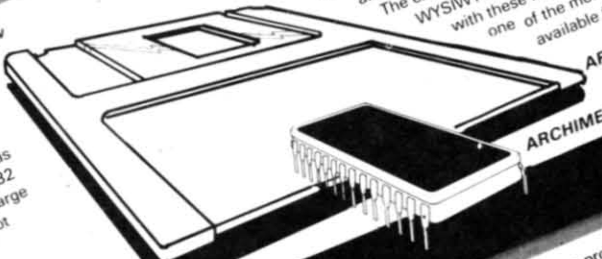

INTER-WORD

A simple to use but powerful spreadsheet. This has also been altered to take advantage of the new 132 column and 64 line screen modes allowing very large sheets to be viewed on screen. Easy to use but not lacking in facilities.

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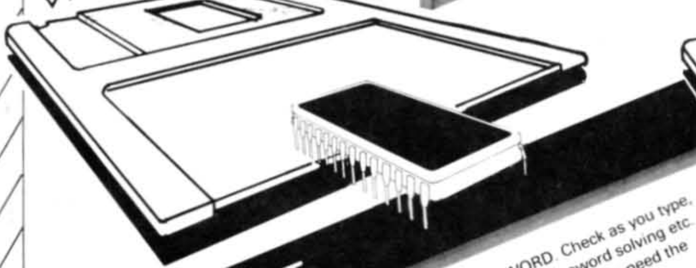

INTER-SHEET

A chart and graph plotting program, now supporting the 256 colour screen modes which can produce impressive colour charts and graphs. An ideal complement for INTER-SHEET, although it can plot graphs from practically any data.

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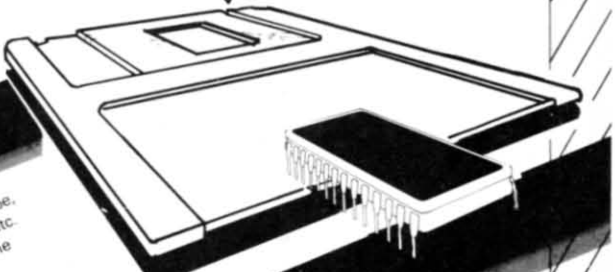

INTER-CHART

An ideal partner for INTER-WORD. Check as you type, new intelligent guess routines, crossword solving etc. This is a native ARM product, and does not need the 6502 emulator.

ARCHIMEDES DISC £39.00 + VAT
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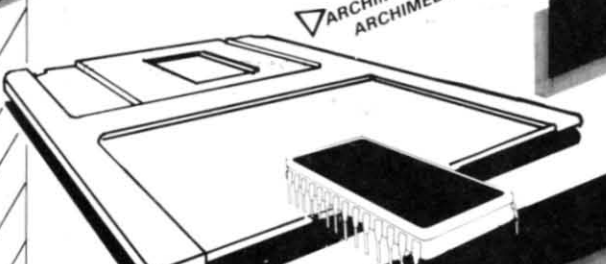

SPELL-MASTER

The INTER products run under the 6502 emulator but with some enhancements and other changes to suit the Archimedes. They are all compatible with the BBC versions and can load BBC files with no changes. No ROM-LINK facilities are available.

Computer Concepts Ltd

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Dangling on a string

The Mad Hatter examines the classic marionettes' game

LARSOFT adventures have never been featured in this column with their full solutions before. And a considerable number of you have experienced difficulties with Geoff's last adventure *Puppet Man*. Since it is now 18 months old I think the best thing to do is to serialise the full solution over the next few issues.

One problem, I feel, is that not all of you have taken the trouble to talk to the various characters encountered in the game. Apart from uttering some dreadful puns, the Butcher and the Candlestick Maker do offer some worthwhile assistance.

The background to this delightful adventure is a classical one: Three of the Nine Muses need your help. They are Terpsichore, Thalia and Erato – the Muses of dance, comedy and lyric poetry respectively.

There are three characters in the adventure who, if helped in various ways, enable each Muse to provide the necessary inspiration.

Ballerina cannot dance until her shoes have been found, Tomaszewski the clown cannot perform until the eggshell with his clown-face identity on it has been found and poor Pierrot, having written a love-poem to Columbine, has locked it away and lost the key. So off we go to get Ballerina on the hop and thus satisfy Terpsichore.

First of all, wake up and move E to talk to the Muse, then go to the Manor House grounds and enter the house itself. Go Up and N to the Study and take the Ladder.

Next move S and E, open and examine the cabinet then take the Slippers and leave the Manor House. From there go to the Crossroads and then N, N and W. Drop the Ladder, climb it and examine the hollow to disclose the jacket. Examination of the jacket produces a silver key which you should take back to the Manor House.

Once inside, go N from the bottom of the stairs to the Lounge. Open the closet, examine it and then do the same with the skeleton. Take the skeleton key and return to the Crossroads.

From here go S to the Village Green and then W to the Village Hall. Open the Hall and go inside, examine the goods to reveal the shoes and take them.

Finally to complete this section of the adventure, return to the Muse and give her the slippers and then go back to the Manor House, go upstairs and W to Ballerina and give her the shoes.

Disc problems

The lads at Heyley Software tell me that some folk have been experiencing difficulties with the SAVE/LOAD aspect of some of their disc-based adventures.

There are two solutions: If you have a twin disc drive, put the save position disc in drive 1 and leave the program disc in drive 0. Alternatively, return the disc to them and they will send you a bug free copy. Future adventures will not have this problem.

Hatter's Helpline

I have had a request for help from Mr. B. Barlow whose son is enjoying **Sphinx Adventure** – an early Acornsoft offering. He can't find the Goblins Dairy: It's West of the Gnome's Kitchen, not too far away from the Catacombs.

Michael Graham wants help on completing the Second Mission in Elite: As soon as I can sort out why I keep getting promoted to ELITE status without encountering this particular mission, I'll do so.

Jonathan Ormond offers timely advice to Robin Keith: There are *three* Prisms to be found in **Time Machine**. In each case the answer is the same: Return to the machine and INSERT PRISM. Once the third has been inserted you have access to two more time zones.

William Hobden is stuck at the Mansion in **Hampstead** – Pilgrim the Butler won't grant him

Hall of Fame

Congratulations to Thomas and Robert Hughes for sending me the first map and solution to *Golden Baton*.

Further into the Dungeon

Stuart Booth's approach to solving **Dungeon Adventure** differed radically from mine in the middle part of the game. After I had dealt with the carnivorous jelly – see last month's column – I carefully explored the ramp area. Stuart, on the other hand, moved out on to the Face and became upwardly mobile as you'll see.

Once on the Face, move to the nose and then climb the stairs to the Gatehouse. Ignore the disappearing Dwarf at this point and instead enter the nearest gully to avoid being killed by the rolling boulder.

Once you are at the Gatehouse, SAY PASSWORD is the *Open Sesame* while at the main door N of the bridge, you need to BLOW the Stick before it will open and admit you.

Once you are inside, locate the Throne Room and go S and down the ramp. Now you must move around until you are picked up by the Roc.

In the Roc's nest you should take the Rock Crystal and the Caterpillar. Hug or squeeze the Caterpillar so that it extrudes the rope, you need to take this and fasten it so that you can climb down from the nest. Abandon the Caterpillar now as it has no further use.

Below the nest you must get the Will o' the Wisp from the muddy puddle. It is a light source so you can drop the Driftwood here. If you enter LOOK anywhere near the ramp, you will discover the Face Mask.

Go West twice from the Powdery Peat to the Pit and there you'll find the Gem. Hitting it with the Hammer will destroy its baneful influence on you and the Ghostly Orcs.

Exercise monumental self-control and ignore the Silver Collar. Instead climb back up and return to the Throne Room past where the Ghostly Orcs *used* to be. Once you are on the Throne press button four.

This deposits you in the Odd Little Room where you'll find *the* Collar (Mithril). Wear it and then get the Lapis Lazuli and Onyx Oryx, put them and the Crystal, Stick, Face and Figurine into the Packing Case – which you should always carry.

Finally, climb back up to the Throne, and press button five, but make sure you are carrying an *odd* number of objects – use the Violet Collar as a make-weight if needed. Button eight on the Throne provides information and nine teleports you back into the Pit.

Now that you have the Mithril Collar you can go almost anywhere you like: Simply climb on to a coloured Pedestal and enter a colour and you will be transported to the pedestal of the colour you chose.

entrance. The precise input he needs here is MEET CHUBBY.

Mark Thomas is a bit stuck in **The Price of Magik** – I think his main problem is that he rejuvenates too early. You can only renew your youth *twice* during the adventure and so you must plan carefully and do it at the last moment. Apart from that he is totally insane but stuck at the door in the Stone Room.

This door poses just about the trickiest puzzle in the whole adventure: Cast ESP beyond it, cast BOM at the Idol, cast ESP again and then HYP to control the Idol. Now cast ESP again and tell the Idol to open the door.

Martin also has problems with the adventure **L** – in view of the fact that a great many readers are in difficulties with this game, I'm going to provide the full solution in this column soon.

Problem Corner

I have had a plea from Adam Burge concerning a game I've never even heard of: *System 15000.* He's had it a year and can't get anywhere. From his description, it sounds like a game for would-be hackers: Can anyone supply the necessary passwords to get him started?

PROGRAM Library No.22

Compiled by Steve Turnbull

ALTHOUGH we receive dozens of Library submissions every month we can only print a few. One of the main criteria of their selection, apart from their usefulness, is the quality of the documentation. So if you want to stand a better chance of getting your program published make sure you send details about what it does and how it works.

This month we have an interesting selection of routines, including an easier way to access the front end memory from a second processor. There's also an Archimedes routine to help you debug programs or even write simple languages and, finally, there's a pretty print text display program.

Title: Read/Write I/O Processor
Language: 6502
Author: Pieter Allaart

When using 6502 second and co-processors, reading from and writing to the front end memory is far more complicated than simple LDA and STA commands.

The official way is to use the Osword at &FFF1, with the Accumulator set to either 5 for reading or 6 for writing, while X and Y point to a five-byte control block which contains the address and the byte to be read or written. As all this takes a lot of instructions, it would be useful if we had a special subroutine to perform this dreadful task for us.

The listing here does this: To incorporate it into your own programs just copy lines 240-440. You can then use the routine by setting *!block* to the address of the byte you want to access and set A to the value to be written. The routine automatically increments the address so repeated calls can be made without altering *!block*.

```
   10 REM Read/Write I/O Processor
   20 REM by Pieter Allaart
   30 PROCassemble
   40 REPEAT
   50 INPUT"Read address: &"L$
   60 IF L$>"" PROCread
   70 INPUT"Write address: &"L$
   80 IF L$>"" PROCwrite
   90 UNTIL FALSE
  100 DEFPROCread
  110 !block=EVAL("&"+L$)
  120 INPUT"Number of locations to
 read from: &"N$
  130 FOR K%=1 TO EVAL("&"+N$)
  140 A%=USR(readio)AND&FF
  150 PRINT"Value read"~A%
  160 NEXT:ENDPROC
  170 DEFPROCwrite
  180 !block=EVAL("&"+L$)
  190 INPUT"Number of locations to
 write to: &"N$
  200 INPUT"Value to write: &"A$
  210 A%=EVAL("&"+A$)
  220 FOR K%=1 TO EVAL("&"+N$)
  230 CALL writeio:NEXT:ENDPROC
  240 DEF PROCassemble
  250 block=&70:osword=&FFF1
  260 DIM code 50
  270 FOR L%=0 TO 2 STEP 2
  280 P%=code:[OPT L%
  290 .readio
  300  PHP:TXA:PHA:TYA:PHA
  310  LDA #5:BNE oswio
  320 .writeio
  330  PHP:STA block+4
  340  TXA:PHA:TYA:PHA:LDA #6
  350 .oswio LDX #&FF
  360  STX block+2:STX block+3
  370  LDX #block MOD256
  380  LDY #block DIV256
  390  JSR osword
  400  INC block:BNE skip1
  410  INC block+1:.skip1
  420  PLA:TAY:PLA:TAX:PLP
  430  LDA block+4:RTS
  440 ]:NEXT:ENDPROC
```

Get it right!

```
 10 =    0 0
 20 =    0 0
 30 = 126A A
 40 = BFBA 9
 50 = A168 D
 60 = BD58 2
 70 = DCA2 D
 80 = D17A A
 90 = 226C 0
100 = 5A9D 6
110 = 1C67 2
120 = AB1F 5
130 = 14D0 C
140 =  78F F
150 = D8A1 4
160 = E531 9
170 = 99B3 6
180 = 1C67 0
190 = 778A 0
200 =  AF0 9
210 = 2373 E
220 = 14D0 E
230 =  EA2 2
240 = 98A5 F
250 = DCE1 3
260 = 75B1 1
270 = AAB9 C
280 = 7CBB 2
290 = EC1F E
300 = 2FCC 9
310 = 418D C
320 = D3C4 1
330 = BFC0 6
340 = C234 B
350 = D4F4 1
360 =  343 6
370 = 896A A
380 = 2161 0
390 = 62D8 B
400 = 226D 2
410 =  3B8 C
420 = 429A 3
430 = A148 3
440 = 953B 5
```

Title: ARCset
Language: Basic V
Author: Iain Coulthard

This program allows you to write variables on the Archimedes using RETURN as a FN in an EVAL statement: This could have a use in writing simple languages in Basic to allow variables to be typed in by the user.

The variables could also have an invisible prefix by altering the EVAL statement so if *X* is typed in the program would call it *User–X* to keep its own variables safe.

Get it right!

```
 10 =    0 0
 20 =    0 0
 30 = 96E3 3
 40 = BFBA 5
 50 = FDE5 5
 60 = 5ECD B
 70 = A1E1 0
 80 = 2A62 7
 90 = 3818 1
100 = 226C 1
110 = DB6C 7
120 = 6968 5
```

```
   10 REM ARC Set Variables
   20 REM by Iain Coulthard
   30 X=12345678
   40 REPEAT
   50    INPUTTAB(3,5)"Variable name
 ",n$
   60    INPUTTAB(3,7)"New value",v$
   70    dummy=EVAL("FNsetvar("+n$+"
 ,"""+v$+""")")
   80    PRINTTAB(3,10)"X = "X
   90    PRINTTAB(3,12)n$" = "EVALn$
  100    UNTIL FALSE
  110 DEFFNsetvar(RETURN n,v$)
  120 n=EVAL(v$):=0
```

Title: Word wrap
Language: 6502
Author: Terry Blunt

Pretty printing from programs is always tricky to achieve so here's a routine that will print text in any mode without splitting words. It can also print in Mode 7 colours with any defined window width.

The program will work on any BBC Micro – but if you have Basic I then line 580 should be changed to:

```
580 CMP #58:BEQ end
```

after you've made sure you've typed it in correctly using Get it Right!

All the text to be printed should be in lower case unless you have text which needs to be in capitals. When a full stop, question or exclamation mark are encountered a space is inserted and the next character is made a capital – for a comma and semi-colon just a space is added. However if any of these characters would appear at the start of a new line they are not printed at all – but the next character is still capitalised.

Additionally there is not the 255 character limit as there is in Basic – if you load text direct from a word processor whole text blocks will be printed regardless of length until a Return is encountered.

Capitals are generated by ANDing with 95, so if you follow a stop with other characters you can generate interesting control code actions. For example "(" generates a backspace and "-" is a Return. The program is ideal for adventure games and educational programs where lots of text needs to be printed for easy reading.

Get it right!

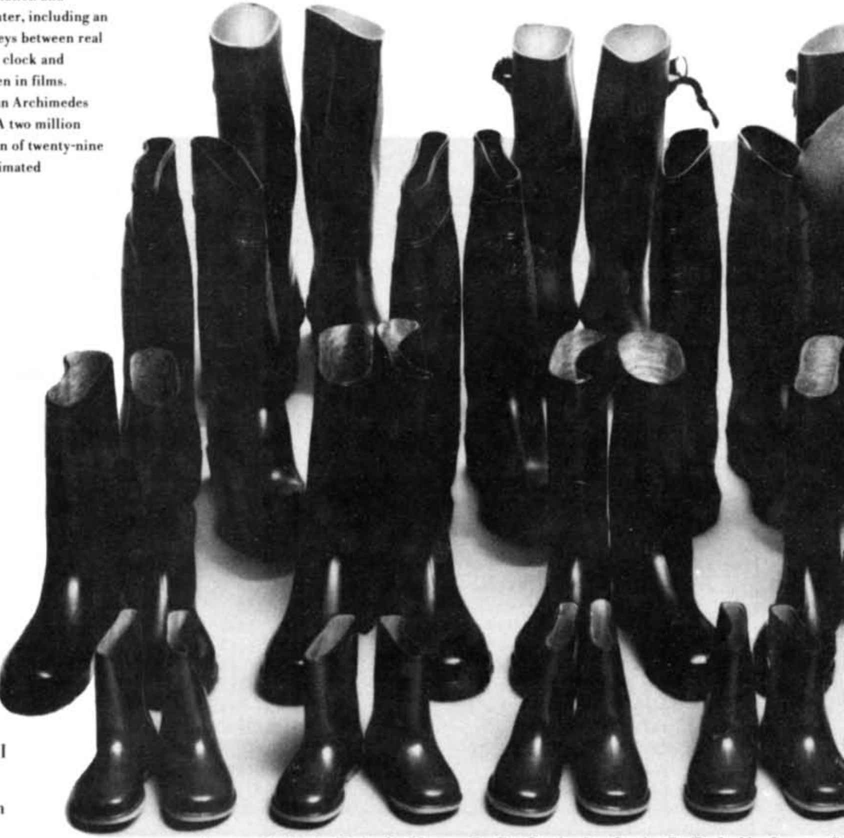
```
  10 =    0 0    260 = 879C 9    460 = D035 A
  20 =    0 0    270 = 905E B    470 = 4176 A
  40 = 916A A    280 = 9FFF 6    480 = 92F2 B    660 = 953B 3     860 = 48D6 C
  50 = A5AA 6    290 = 7B4E 6    490 = 3469 4    680 =  A24 7     870 = DD77 4
  90 = F6D4 B    300 = 3F38 5    500 = 9224 2    690 = 6677 A     880 = 92BF 0
 100 = A45F F    310 = 43C7 A    510 = 9F75 4    700 = 7FF5 C     890 = 3FC0 1
 110 = CE94 0    320 = 9F93 E    520 = 81CB B    710 = D912 7     900 = 7545 E
 120 = 5C3E B    330 = 79C9 5    530 = 5320 5    720 = 5F5B 7     910 = 6C5F 0
 130 = ED0F 6    340 = 549C D    540 = 291F 6    730 =  71A A     920 = 563C 5
 150 = B623 0    350 = 4210 3    550 = 1F13 E    740 = ED0F 8     930 = 11C0 3
 160 = AAB9 E    360 = FED9 7    560 = F057 0    760 = 2C51 2     940 = B2F3 7
 170 = A4D8 A    370 = 7029 4    570 = 5D35 B    770 = 95E6 A     950 = E557 6
 180 = 14FC 9    380 = 4731 A    580 = 9F45 1    780 = A7CF 5     960 = BFB2 C
 190 = 791F 6    390 = 69FD 0    590 = A6E6 F    790 = 8ADA E     970 = 2CD9 A
 200 = 5FE1 5    400 = C50A 8    600 = F2D2 4    800 = 22A7 7     980 = 1BC0 6
 210 = BA2C 2    410 =  672 2    610 = D36F 3    810 = F572 7     990 = E1E0 8
 220 = 6622 4    420 = A04C B    620 = 61E2 F    820 = 5F21 9    1000 = 1765 D
 230 = 12CB 4    430 = 35A1 A    630 = CFA8 1    830 = 62CD 3    1010 =  2BB E
 240 = F72F A    440 = AD48 C    640 = 7F9E 8    840 = 8B57 9    1020 = FE84 0
 250 = BA2C 8    450 = 16CE A    650 = 268A C    850 = D829 F    1030 = 5DAF D
```

```
   10 REM Word wrap screen display
   20 REM by Terry Blunt
   40 MODE7:PROCinit
   50 PROCassem:PROCtest:END
   90 DEF PROCinit:len=40
  100 col=&70:dot=&71:add=&72
  110 base=&C00:osnewl=&FFE7
  120 oswrch=&FFEE:osbyte=&FFF4
  130 ENDPROC
  150 DEF PROCassem
  160 FOR L%=0 TO 2 STEP 2
  170 P%=base:[OPT L%
  180 .print
  190  JSR findpos:LDA (add),Y
  200  JSR endfind:BEQ wordjump
  210  CMP #&20:BCS space:RTS
  220 .sentence:STY dot
  230 .phrase CPX #&02:BCC space
  240  JSR oswrch:LDA (add),Y
  250  CMP #&20:BCS space:RTS
  260 .newline JSR osnewl
  270 .space JSR findpos
  280  CPX #&01:BEQ word
  290  CPX #len-1:BCS newline
  300  LDA col:JSR oswrch
  310 .test LDA (add),Y:INY
  320  CMP #ASC"!":BCC clear
  330  JSR endfind:BEQ clear
  340  CPY #len-1:BCC test
  350 .clear
  360  INX:DEY:BNE clear
  370  CPX #len+1:BCS newline
  380 .word JSR findpos
  390  CPX #len:BCS newline
  400 .wordjump
  410  LDA (add),Y:JSR incadd
  420  CMP #ASC"|":BEQ clearend
  430  CMP #&20:BCC clearend
  440  BEQ space:JSR endfind
  450  BCS sentence:BEQ phrase
  460  LDX dot:BNE nocap
  470  AND #&5F:INC dot
  480  CMP #&32:BCS nocap
  490  CPX #&01:BCS nocap
  500  JSR oswrch
  510 .nocap JSR oswrch
  520  CLC:BCC word
  530 .incadd INC add
  540  BNE clearend:INC add+1:RTS
  550 .endfind
  560  CMP #ASC"!":BEQ end
  570  CMP #ASC"?":BEQ end
  580  CMP #ASC":":BEQ end
  590  CMP #ASC".":BEQ end
  600  CMP #ASC";":BEQ clearend
  610  CMP #ASC","
  620 .clearend CLC
  630 .end RTS
  640 .findpos LDA #&86
  650  JSR osbyte:LDY #&00:RTS
  660 ]:NEXT:ENDPROC
  680 DEFPROCtest
  690 ?dot=0:REPEAT
  700 REPEAT ?col=(?col+1)MOD7+128
  710 UNTIL ?col<>132
  720 READ $&900:!add=&900
  730 CALL print:UNTIL $&900="too."
  740 ENDPROC
  760 DATAi think it's quite amazin
g
  770 DATA.
  780 DATAthis set of data lines is
  790 DATAintended to test the
  800 DATAformatting of the text
  810 DATAand the colour possibilit
ies
  820 DATAas well.
  830 DATAall lines are OK.i hope!
  840 DATAwell let's give it a try
  850 DATAout then.
  860 DATAthis is a 39 characters
  870 DATAline so:
  880 DATAthis line contains 40
  890 DATAcharacters truly.
  900 DATAthis line contains forty
  910 DATAcharacters too
  920 DATA.well the trailing stop
  930 DATAsupressor seems OK.
  940 DATA,,,
  950 DATAthe blank line skip-over
  960 DATAworks and
  970 DATA"  leading line spaces"
  980 DATAare suppressed and
  990 DATA";semi-colons,and commas"
 1000 DATA"are also,intelligently"
 1010 DATAdealt with.the (special?(
)
 1020 DATAcharacter effect is a go-
er
 1030 DATAtoo.
```

STAR TREK OR

(What other micro has

Dr C J Baddiley has written many astronomical simulation and graphical analysis programs on his BBC microcomputer, including an accurate relativistic space flight simulator for journeys between real stars and galaxies, with high resolution graphics and clock and distance displays. It shows dramatic effects never seen in films. "The increase in speed of this program running on an Archimedes system is truly staggering," Dr Baddiley explained. "A two million light year journey from Andromeda galaxy to our Sun of twenty-nine years duration shows as a two minute continuous animated sequence."



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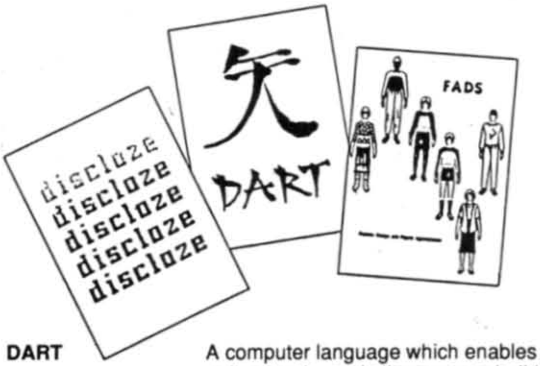

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SOFTWARE SCENE

The Empire Strikes Back ... the sequel

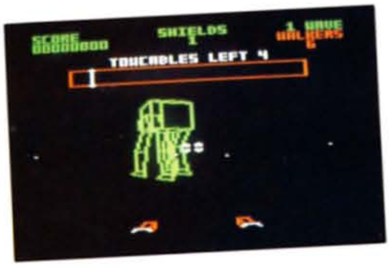
Price: £9.95 (tape)
Supplier: Domark, 22 Hartfield Road, London SW19 3TA.
Tel: 01-947 5624

LAST March I reviewed the BBC Micro version of the Atari arcade hit Star Wars in which the Empire received a real pummelling from the rebel pilots. Now comes The Empire Strikes Back in which an extremely miffed Darth Vader launches a concerted attack against the rebel forces.

Before beginning the game you are given the opportunity to re-define the control keys – a useful and very welcome feature. Unfortunately, you are limited to using letters only – the ? * and Return keys are not acceptable. Along with Z and X, these must be the most common preference for computer gamers.

The Empire Strikes Back uses the same multi-game format as its predecessor, with Probots, Walkers, Tie fighters and asteroids forming the four sections to be played. They all employ the same vector graphics used in the Star Wars program.

The Probots are tall mechanical devices that scour the rebel planet in search of your secret base. Sat astride your snowspeeder you dodge enemy laser bolts and return fire, destroying as many Probots as possible.



No matter how well you perform in this first section the Imperial forces still manage to get a fix on your base and section two begins. Lord Vader dispatches a whole battalion of Imperial Walkers to destroy the rebel power generator – these are of two types, the small but nimble AT-STs, and the huge lumbering AT-ATs.

The two legged AT-STs fire at you, but can be destroyed with laser fire. The larger elephantine AT-ATs are practically invulnerable to your puny lasers, but will fall foul of a strategically fired tow cable. A direct hit causes the machine to sink to its knees before exploding – a very nice touch.

Section three is a repeat of the Tie-fighter attack that proved to be the high spot of the Star Wars game. Assuming the role of Han Solo, you pilot the Millenium Falcon in a fast and furious dog fight against a squadron of Imperial fighters. The auto-repeating fire button is very welcome as things begin to heat up.

Then comes the final section of the game: The asteroid field. No matter how many times I attempted to negotiate this one, I always fell foul of one asteroid too many. The huge angular shapes proved to be impervious to laser fire and practically impossible to dodge. Give us a chance, Domark.

You are given the option to start the game on any one of three difficulty levels, although they all seemed very similar to me.

The Empire Strikes Back is an all-action, zap and blast, arcade game and even better than Star Wars.

Nev Astly

Sound	***8***
Graphics	***8***
Playbaility	***9***
Value for money	***9***
Overall	***9***

Orion ... faster than light

Price: £14.95
Supplier: Minerva, 69 Sidwell Street, Exeter, Devon EX4 6PH.
Tel: 0392 37756

FOR those who have never played arcade Defender – or the BBC Micro version Planetoid – the game goes like this: You pilot a spaceship which bears an uncanny resemblance to a Nike training shoe on a mission to protect Earth from swarms of invading landers which drop down trying to capture little men – neatly dressed in green shirts and blue trousers.

If they succeed and take one of the little men up to the top of the screen they turn into mutants and very aggressive little beasts they are too.

You have some defence though: You can shoot with a forward gun/laser, run away, jump into hyperspace or kill everything on screen using a smart bomb. Points are gained for destroying the enemy and for returning captured men to the ground. After 10,000 points you get an extra life and another smart bomb.

If you liked Defender or any of its clones this version will not disappoint you. It is fast – too fast for me – and smooth. It has a pause facility and redefinable keys so that when the Return key is ruined by the hammering it gets from your trigger finger you can still play the game. There is a high score table and the sound is optional.

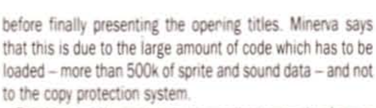
There are 99 different levels and at higher levels the number of monsters increases – I have counted 50 objects moving on the screen at one time with no perceptible slowing down of the action. The sprites – created using Minerva's own soon-to-be-released Atelier – are clear and move smoothly with both colour and shade used to very good effect, although some are a little small.

But what makes this game is the sound: Lucas Fowler, B.J. Stearne and Merlyn Kline have either a very good sense of humour or a very weird sense of relevant sounds. If you manage to shoot a lander which has captured a man you are greeted by the sound of a falling piano.

When the Nike trainer gets destroyed the resulting explosion has the same tonal quality of a banger going off inside an empty baked bean tin. While if you foolishly allow a lander to change into a mutant it rushes at your ship like a pair of fighting cats.

My 12-year-old daughter has fast reactions and nimble fingers, and her squeals of delight pay tribute to the enjoyment that this game's sound effects can give.

I only have one complaint, and that is not with any aspect of the software but with the time taken for it to load – it takes well over a minute before the spacebar can be pressed to start the action. When I first booted the disc I thought that there was something wrong.



The disc drive seemed to make several attempts to load before finally presenting the opening titles. Minerva says that this is due to the large amount of code which has to be loaded – more than 500k of sprite and sound data – and not to the copy protection system.

This high quality product is an excellent example of a very well-known game that you either love or hate. I think that lots of you will part with £14.95 for a copy.

Peter Blenkinsop

Sound	***8***
Graphics	***9***
Playability	***8***
Value for money	***7***
Overall	***8***

SOFTWARE SCENE

Pipeline ... going down the tubes

Price: £9.95 (tape) £11.95 (disc)
Supplier: Superior Software, Regent House, Skinner Lane, Leeds LS7 1AX.
Tel: 0532 459453

IN an effort to supplement Earth's dwindling supplies of sulphur, a mining operation was established on Io, one of Jupiter's moons. However, recent volcanic activity has surrounded the robot-controlled mining platform with a sea of burning suplhur.

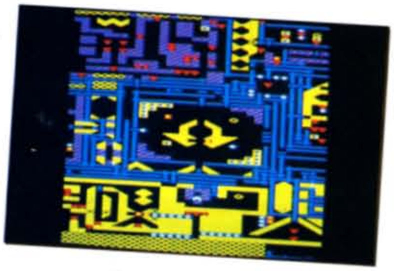
So desperate is Earth's need for the precious chemical that you have been sent to Io to collect every single drum and close down all four mining platforms.

Arcade/adventure games have become something of a trademark for Superior, with classics such as Ravenskull and the Repton series. The dimensions of Pipeline make the little green lizard look like a screen from Pacman.

If you were impressed when you first examined the map of Repton 3, prepare to be amazed by the Pipeline layout – each of the four levels is twice the size of a Repton scenario.

Ever conscious of the value for money offered by the budget sofware houses, Pipeline has been beefed up into a top notch package. Not only do you receive the best arcade/adventure game on the market, you also get a character designer, level designer and mission generator. Added to which Superior is offering to market the best original game created with these utilities.

At first glance Pipeline resembles Ravenskull – the action is viewed from above while a space-suited hero scuttles around a beautifully drawn, but deadly, maze.



As you appear at the start of level one it doesn't take long for you to realise that you have materialised inside a sealed compound. Ignoring this fact for the moment, you begin to collect sulphur drums.

By the time you have gathered all the available sulphur you will also have found a remote control unit and a set of blueprints. Though the remote control unit has little effect, the blueprints teleport you to the inner reaches of the mining platform.

The place where you appear just happens to be a room with two exits – the first guarded by a control robot, the second blocked by a locked manhole cover. It is at this point that you are expected to discover the significance of the remote control unit – it moves manhole covers.

Examination of your surroundings reveals a distinct lack of sulphur drums and it is now time to enter the Pipeline. This is a complex network of pipes through which the sulphur is normally pumped. Since the platform is no longer active it can be used as a means of getting from A to B – unfortunately you have no idea where B is.

Summoning your courage you step into the Pipeline. Using multi-directional scrolling at breakneck speed the display traces your passage through the twisted network. If you are lucky the terminus will not consist of a bubbling sulphur pit or an oncoming fireball.

Flames can be of two types – stationary or mobile. The former are only a problem when you are racing to complete the level before the countdown expires. The latter follow pre-determined routes through their own sections of maze and are a major cause of premature death due to their high rate of travel. You can only see a small proportion of the maze, so are very vulnerable to charging fireballs.

There are 16 different objects to be found in the maze – including mallets, space burgers, spanners, magnets, lasers, explosives, detonators and one control robot.

One word of warning to those who have a comprehensive selection of roms fitted – I found it necessary to disable each one before the program would run.

Pipeline is a masterpiece of brain-twisting entertainment. If Rubik ever turned his hand to computer programming he would produce something like this.

Jon Revis

Sound	
Graphics	*10*
Playability	*10*
Value for money	*10*
Overall	*10*
	10

Plague Planet ... catching a cold

Price: £11.95 (disc)
Supplier: Summit Software, PO Box 25, Portadown, Craigavon BT63 5UT.
Tel: 0762 42510

ARCHIMEDES adventures are at last coming on to the market steadily and Plague Planet is available for the Archimedes as well as the BBC Micro. Initially, I played both versions simultaneously in order to make comparisons, but abandoned this technique as soon as I had made sure that the essential plot of the adventure was the same for both machines.

The Archimedes version I have seen runs under the 6502 emulator, and thus is a trifle slow – nice loading screen, though – but versions for sale are now written in ARM code and players will have the option of using keyboard or mouse to select input.

Good documentation and packaging include the offer of a well thought out sheet providing a choice between sensible hints and outright answers to puzzles.

Far in the future, mankind has spread among the stars and subsequent strife meant that planets became isolated until political stability returned once more, centred on Rigel IV. Now agents from there wander far and wide in attempt to reconstruct the Empire.

One such agent crash-lands on your own planet not far from where you, an enterprising rural type, just happen to be.

The opening sequence includes an interesting chaining puzzle and a maze. You won't be able to map this one by dropping objects, but the solution is clearly signposted for the discriminating adventurer.

After wandering to and fro, collecting essential equipment and data, you are free to examine the crashed spacecraft in its' crater – always provided you have put in the necessary spadework, that is.

The task modules involved are as follows: Visit the village area to collect equipment, visit the crater to discover the ship, visit the village to collect information and then return to the spaceship.

I'm giving this additional help so that even beginners will have a stab at this entertaining and humourous adventure and get well on the way before facing any serious tasks.

Once you explore the spaceship seriously you will soon find that you are the unwitting agent of disaster – opening the ship released a deadly virus that will destroy you, and your whole planet in 10 days – unless, you can locate the essential ingredients of the antidote from the planets Arboreta, Zenthar, Aquaria and Vulcania.

I had to go back to the beginning on more than one occasion as I worked out the correct sequence of events and once I was well into the adventure before I found that I lacked the necessary esprit-de-corps to put a stop to inimical activity. I must be too tidy minded.

This adventure was written using ALPS – the Adventure Language Programming System Rom and the ALPS Extension disc. The parser is certainly workmanlike, allowing input such as EXAMINE THE DOOR AND THEN OPEN IT or DROP EVERYTHING AND GO NORTH THEN WEST.

However, I found one or two slight niggles – for instance, it is essential to throw a rope at a certain location if you are to rise above your problems. Having done so, I read *You can see a strong fence post with a rope tied to it and a coiled up rope*, where in fact there was only one rope. A status flag had not been properly reset, and I almost got into trouble.

Similarly, at one point when a piece of paper fluttered to the ground, I couldn't GET PAPER – but the item was there – and was described accurately (but differently) as I discovered on entering LOOK. Don't let these niggles put you off, though. A product well worth buying for either micro.

Mad Hatter

Atmosphere	*8*
Complexity	*8*
Presentation	*7*
Value for money	*7*
Overall	*7*

Triple Decker volumes 7 & 8 ... games galore

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Supplier: Alternative Software, Units 3-6 Baileygate Industrial Estate, Pontefract, West Yorkshire WF8 2LN.
Tel: 0977 797777

DELVING once more into the seemingly bottomless pit of budget software, Alternative has put together volumes seven and eight of its rapidly expanding Triple Decker range.

Triple Decker volume seven opens with **Atom Smash** – a game which shuns conventional theories on sub-atomic physics in favour of the Alternative approach.

The nucleus of every element up to number 17 in the periodic table has become unstable. In an effort to rectify this situation you and your ship have been miniaturised and armed with a supply of gluons – sub-atomic particles of the boson variety that bind quarks in hadrons. They are represented as red blobs.

Starting with hydrogen, you must collect a gluon from the warehouse and fly it to the docking point on the nucleus. This process has to be repeated five times while avoiding the single electron that bounces around the screen. Logically enough, the number of electrons increases as you progress through the periodic table. This is a simple game that is well programmed and fun to play.

Knockout is a version of Breakout that has been turned on its head – presumably because it makes the programming easier. At the top of the screen a cannon ball floats horizontally right and left – below this a brick wall advances skywards. The aim is to smash every brick before the wall reaches the cannon ball.

Having eliminated the traditional bat from the game you are restricted to pressing the spacebar whenever you want to drop the ball vertically from its current position.

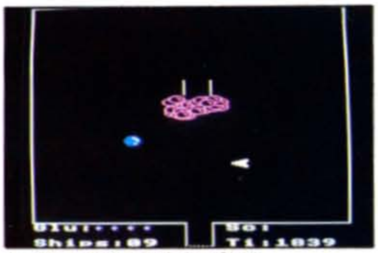
Even before the demolition of the first wall is complete, a second wall has appeared and is heading your way... will this torment ever end?

If you have failed miserably at either of the first two games it could just be that your faculties are waning and the old reflexes just aren't what they used to be. Program number three – **Reaction Tester** – will let you know, to one hundredth of a second, just how fast you really are.

Using a traffic light system, the program flashes a red, yellow then green bar on the screen. As soon as the green bar appears you must press the spacebar. This action stops the clock and displays your time along with a rating from excellent to poor.

The first game of Triple Decker eight is **Grebit**, an excellent version of the arcade classic Frogger. Your task is to guide the ambling amphibian from his starting point on one side of the M25 to his lily pond on the far side of a raging torrent.

With a total of nine lives to play with, you may think that it's all going to be a piece of cake, but don't believe it.



Stunning atomic theories in Atom Smash

My only grumbles are the lack of sound when the frog jumps and the poor choice of colours – the frog is practically invisible when sitting on one of the swimming turtles.

In **Mr. Freeze** you are the proprietor of a successful frozen food company, so successful in fact that an unscrupulous rival has sabotaged your warehouse – represented by a screenful of ice blocks, between which have been placed a number of electric fires. As each fire is switched on its countdown timer begins to tick – if this reaches zero before you reach it then you lose a life.

You can only run on the ice blocks – which promptly melt as you leave them. Movement is allowed in both the vertical and horizontal planes, and you may also slide a row of ice blocks left or right. Unfortunately only half of the last sentence is true – my Mr. Freeze was limited to vertical movement only and the ice blocks refused to travel in any direction but left.

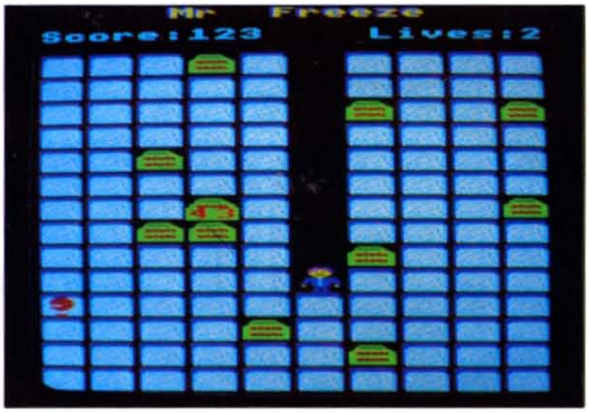
The final game, **Fruit Worm**, follows the adventures of a small worm with a voracious appetite for fruit. Moving at a steady pace, you must guide the worm between rocks in its search for nourishment. However, the more it eats, the longer it becomes, until finally it bites its own tail and the game ends.

Fruit Worm looked quite good, but was completely unplayable due to a nasty bug – as soon as I pressed any key to begin the game the worm shot off to the right and promptly died on the garden fence!

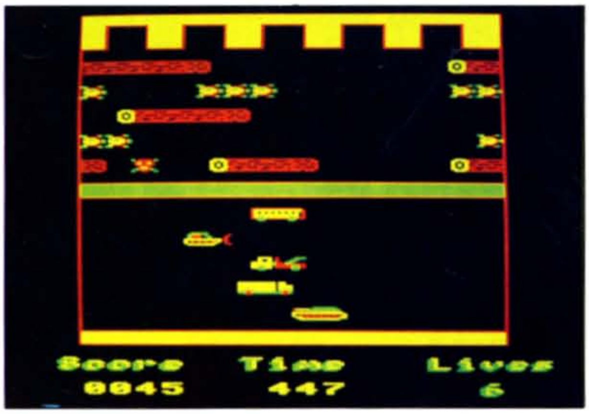
Triple Decker volume eight would have easily out-classed volume seven were it not for the bugs. My copy may have been unrepresentative, but hang on to your receipt just in case.

Steve Brook

Sound	*5*
Graphics	*6*
Playbaility	*5*
Value for money	*7*
Overall	*6*



Mr Freeze in the ice



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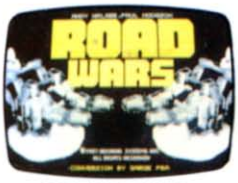

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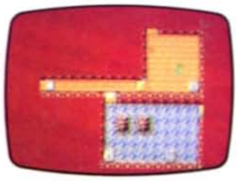

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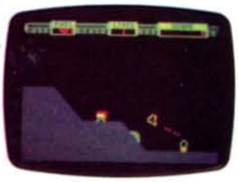

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A taste for adventure

Howard Roberts looks at the Archimedes games scene

FANS of text-only adventure games will almost certainly have heard of Infocom – the most famous producer of micro adventure games in the world. The company has many excellent titles to its credit, including Zork, Enchanter and Deadline.

Until now Infocom products have not been available for Acorn machines, partly due to the memory required. However, with the appearance of the Archimedes PC Emulator, we can now play them. The titles looked at here are three of the most famous available from this prolific company and can all be played using the emulator.

Products: The Hitch Hiker's Guide to the Galaxy, Leather Goddesses of Phobos and Bureacracy
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The Hitch Hiker's Guide to the Galaxy is a game based on Douglas Adams' hilarious storyline. Indeed, he's credited as co-author and the text certainly shows touches of his original sense of humour. You start as Arthur Dent, minutes before your house is to be demolished by several large yellow bulldozers. You face the problem of waking with a monumental hangover, trying to find an aspirin and having *no tea*.

The game follows the original storyline closely until you leave the planet with Ford Prefect, your pal from Betelgeuse. From there on the puzzles are new, although old favourites do make an appearance: The Infinite Improbability Drive, The Ravenous Bugblatter Beast of Traal and, of course, Marvin the Paranoid Android.

As an Infocom adventurer, you are nobody until you have solved the Babel Fish puzzle. The problem is that you need to get the fish in your ear. There is an all-but inexhaustible supply of them in a large tank in the wall and upon activating the dispenser, one flies out and disappears through a hole in the wall.

You can cover up the hole and release another fish, only for it to bounce off your cover and fall through a grate in the floor. The puzzle continues in this vein for another three or four obstacles until you finally manage to obtain the fish. This puzzle is one of the finest I have come across.

Despite all this praise, Hitch Hiker falls down mainly in not having any sort of coherent plot or finale. However, my main feeling when finishing this game was *Wow! When is the sequel coming out?* I would recommend it unreservedly to moderately experienced adventurers – but it's not a game for beginners.

The provocatively titled **Leather Goddesses of Phobos** is actually a spoof on 1930's pulp sci-fi magazines where scantily dressed Amazons strode the Galaxy in thigh-length boots and bulging bikinis.

You're cast as an innocent citizen – gender determined very early on – kidnapped by tentacled aliens and transported to Phobos, one of the moons of Mars where the Leather Goddesses are plotting to enslave the people of Earth and make them their lifelong servants.

The title should give some suggestion as to what the main preocupation of the game is. If you haven't guessed perhaps the message at the start of the game: *You feel an urge*, will give you a clue, along with the fact that there are two playing modes: *Lewd* and *Suggestive*. When you enter Lewd mode you are asked for your age any value lower than 18 results in the program playing Suggestive mode.

The text is not particularly ribald and instead takes the form of obvious innuendo. For example, if you get captured in the prison you are disposed

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◄ *From Page 37*

of by the prison doctor with objects as varied as a tub of yoghurt, some long rubber hosing and a yak. None of the puzzles are obscenely biological and, rather than being nastily presented, they're often quite humorous.

There is a warning at the beginning of this game that some of the material may be distasteful to some people, though the author makes his views clearly felt about the sort of people who treat it as pornography rather than as a bit of fun. Overall this is a good game that would be quite suitable for the beginner who enjoys a little harmless innuendo.

I have just one thing to say about Bureacracy: Aarrrgghh! It's slowly driving me insane as, no doubt, Douglas Adams would be very pleased to hear. He has decided to share his problems bundled in red tape with us all and it is a complete change of scenario from Hitch Hiker.

You have just been employed by the Happitec Corporation and are due to attend an all-expenses-paid training seminar in Paris. However, you have just moved house and your payment cheque has, of course, been sent to your old address because the bank's computer wasn't too happy with your change-of-address form.

The new owner of your old house has left a message on your answering machine to the effect that he wasn't too pleased about the dry rot you *forgot* to tell him about and refuses to forward your mail.

You are left completely penniless, in an empty house, trying desperately to find some money so that you can catch your flight to Paris. Your one hope is the bank but, unfortunately, it has a rule that you must have more than 10 dollars in your account at any given time. You happen to have exactly that amount so any request for withdrawal is refused.

This game is proof that an adventure doesn't need to have more than 100 locations to be good. In fact, I would be surprised if there are more than 50. Your basic surroundings are your street, the houses and shops on it including a bookshop, a fast-food restaurant and the bank.

Don't buy this game if you are a beginner or have no patience. I considered myself, as an adventure writer, experienced in this field, but I have now been put in my place – though it helps knowing that the highest score I have heard of so far is a mere 10. You have been warned.

For a little light relief, there are a few silly items included in the packaging of all the adventures. In Bureaucracy you are presented with a copy of Popular Paranoia Magazine and in Hitch Hiker there's a pair of peril-sensitive sunglasses – totally black. I'll leave you to discover for yourself what comes with Leather Goddesses.

Finally, the recommended selling price of these games is quite high but they're worth it.

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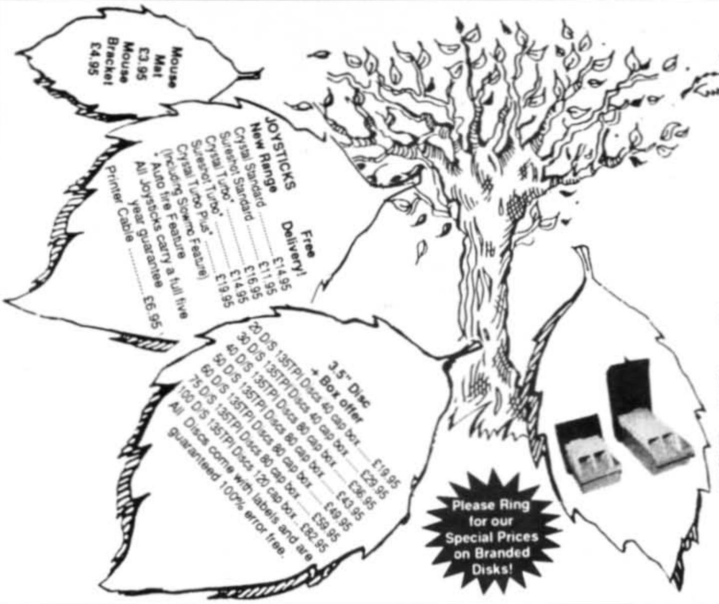

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On the agenda ...

- Incompatible filing systems
- Rejuvinating a sick BBC Micro
- Taking control of a buggy
- Remote games playing
- Expanding the user port
- Fixing a faulty key

Backup puzzle

AT our school we have a number of Masters and a BBC B, OS1.2. There's also a double disc drive, a number of single drives and a Viglen duck to connect two single drives. We have some ADFS 80 track discs we want to backup and convert to DFS.

The BBC B uses the duck but has no ADFS and the Masters, OS 3.20, corrupt discs when using the duck. How do we backup the discs? – **Paul Watts, Guildford, Surrey.**

● *You could always remove one of the terminating resistors from a disc drive and use the duck with the Master. However, perhaps the simplest solution is to link the two machines via the serial port and use some communications software to transfer the files – you could even just type *FX2,1 on the Master and *FX3,1 on the BBC B then just LIST from one to the other.*

Finally you could perform a tedious sequence of loading a file, changing the filing system and disc and saving it again on the Master alone.

Cure for old age?

CAN you offer a solution to the problem my issue 4 BBC Micro is giving me? It's just celebrated its fifth birthday, so I suppose I'm due for some technical hassle. The machine continually crashes and then won't accept any keyboard input except Break, and often this fails to improve anything.

Occasionally it outputs "OSCLIOSCLI" as it goes down. Does this mean anything to you? The crashes have become very frequent so effectively my faithful BBC Micro is out for the count. – **Sheldon Young, Westgate, Co. Durham.**

● *You'd probably shout "OSCLIOSCLI" if you were about to crash. All this tells me, however, is that you have Basic 2 in your machine.*

Micros – like people – grow old, and common to both is that they can suffer from bad joints. This is especially true of any non-soldered ones such as the keyboard connector and the power feeds to the main board. While it could be a component that is getting fragile and doing a nose dive as soon as it gets the slightest bit warm, it is more likely that an overall re-crimp might rejuvenate your machine.

Remove the power leads and give the connectors a squeeze with some pliers so they tighten their grip on the connecting spades. Try reversing the keyboard connecting ribbon and the old standby of pushing all the chips down firmly. If this does not do the trick you'll have to take it to your local service centre where they can put it on a life support system and find out what is failing.

Getting control

I WOULD like to build a small maze-solving buggy controlled and guided by an on-board micro.

The first problem to solve is what micro to use, and this is where your vast knowledge and experience come in. Obviously as a BBC Micro user, a 6502 based unit would be most appropriate. But the only small controller cards I have seen recently use Z80 and 8052 processors and I don't fancy the complexity and expense of a cross-assembler.

So, what I need is a board the size of a Eurocard – or smaller – with a CMOS 6502, one or two 6522s, 4k ram, 4k rom and so on. Do you know if anyone sells one at the moment or can you direct me to a suitable circuit diagram? – **Andy McClements, London SE16.**

● *Several people make 6502 controller boards and I have reviewed several in the past. Two that spring to mind are CMS (0223 324141) and Lancaster Consultants (0524 65179). As you say it's not a particularly difficult thing to make.*

As to cross assemblers, they are not very difficult to write in Basic although slow and without the fancy facilities of commercial systems.

Pie in the sky

RECENTLY my friend and I bought Double Phantom by Doctor Sofware: An excellent flight simulator that requires two BBC Micros and a supplied link which uses the user port. We wondered – as we live nearly two miles away from each other – if it is possible to create a radio link between the two user ports.

The only physical obstruction between our houses are other houses. Another idea we had

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◀ From Page 39

was to link through the mains wiring itself.

We hope that you will be able to find the solution to our problem as we don't think that rucksacks are very healthy for BBC Micros! – **Neil Burgess and Gregroy Emms (aged 15), East Barnet, Herts.**

● *Unfortunately there is no simple solution to this problem. Radio link requires that you are both licensed radio amateurs and then you would need to transmit and receive at the same time. This is known as duplex communications and the problem with this is that the transmitter de-sensitises the receiver so nothing can be received. This can be overcome, but it is technically difficult.*

Communications through the mains supply is possible but mains is generated in three phases with only one phase being fed to any house. If you and your friends' houses are on different phases there is no way you can get through. In addition long distance mains communications are often difficult due to fall off in power with distance and the filtering that is periodically distributed around.

Infra-red or ultrasonic links are possible but you may have trouble generating the necessary power to cover the distance. One solution might be to try earth communications.

This is a little known technique that I first tried when I was your age – a little over 20 years ago. Basically what you do is to bury two biscuit tins as far apart as possible and wire them up to an audio amplifier.

You then pump a signal into the ground and pick it up on a similar arrangement fed to the input of an amplifier. Maximum range is about one mile with 50 watts of audio. Depending upon the impedence of your earth you might have to use a matching transformer to achieve optimum coupling between the amplifer and earth. You could then use a modem to send audio signals. I rang the DTI – Department of Trade and Industry – who licence communications and they were not aware of any restrictions on this.

Summing up, it's probably easier to move the micros.

More lines for the micro

I AM building a project for my GCSE technology which requires 12 output lines from the micro. A friend told me that one of your Body Building projects was to use the 1MHz bus as a user port.

Please could you tell me which issue this was in and whether the kit is available from Musbury Consultants? Also, I own an Electron with ACP's

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AP5 interface: The triple interface with user port, 1 MHz bus and Tube. The Electron's memory map is different from the BBC Micro's and therefore the above are accessed at different locations. Could you please tell me where? – **Paul Green, Lower Feltham, Middx.**

● *The user port expansion board was published in the August 1985 issue of* The Micro User *and unfortunately the printed circuit board is no longer available. If you want to make it yourself send a SAE to Musbury Consultants who will send a photocopy of the artwork. However it's a double sided design with plated-through holes so it's a bit tricky to make.*

A better solution – as you only need a few extra output lines – would be to use the printer port. However if you don't want to tie that up you can use the Multiplexer board – Pack 29 – that will give you 32 inputs and 32 outputs from the user port. This was described in the December 1985 issue of The Micro User *and a few boards are left priced at £25.00 for the kit and £29.00 assembled.*

The user port on the BBC Micro is at address &FE60 to &FE6F, the AP5 however has it at &FCB0 to &FCBF. Changing the software to reflect the new position of the port is an almost trivial task and should not prevent operation of any of the Body Building projects.

Phantom keypress

I OWN a Master 128 and together with your excellent magazine I am happy. But recently I have come across a very annoying problem: When I turn my micro on everything seems fine then all of a sudden the number one comes up and automatically repeats itself and I have not even touched the keyboard.

The machine isn't overheating because it happens as soon as I turn it on. I'm not an expert but I have dusted and cleaned the inside of my computer to no avail. I would be very grateful if you could advise and possibly tell me the cause of my problem – **C. R. Broughton, Erdington, Birmingham.**

● *The contacts of number one key switch must be resting together separated only by a thin oxide layer and occasionally this breaks down and you get the effect of the key being held down. The auto repeat facility then fires characters into the input buffer.*

*The most effective solution would be to replace the key with a new one, or failing that with one that is little used. As a temporary measure you could try inputting *FX11,0 to turn off the auto repeat and so when your key sticks it only produces a single digit.*

Have you any hardware problems with your BBC Micro? If so, write to Mike Cook, The Micro User, Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP, giving full details of your system and the problem.

Unfortunately, Mike cannot send you personal replies, but as many questions as possible will be answered on the pages of The Micro User.

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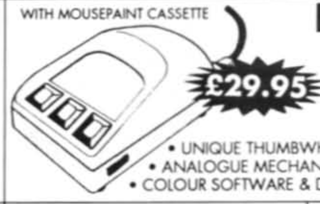

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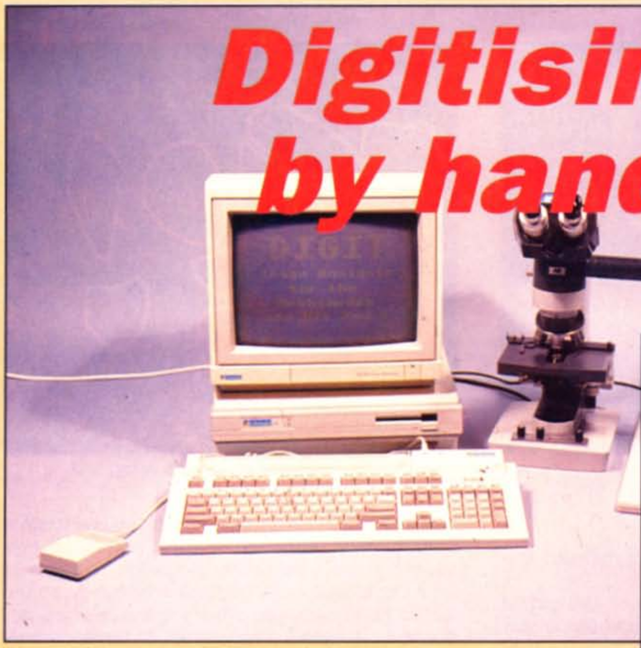


Figure II: Microscope, digitiser and Archimedes computer

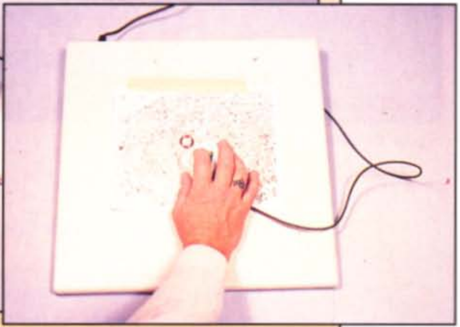


Figure I: Bit-pad 2 digitising tablet with cursor, entering data

Ian Whitmore measures the cost

Product: Digit
Price: £150.00
Supplier: Institute of Ophthalmology, Judd Street, London WC1H 9QS.
Tel: 01-387 9621

Product: Summagraphics Bit-pad 2
Price: £405 (with Digit)
Supplier: Reflex
Address: Viewpoint, Gardner Road, Maidenhead, Berkshire.
Tel: 0628 771166

MANY fields of science require input and analysis of data concerning the spatial arrangement of structures. My own field of interest concerns the two and three dimensional arrangement of various components in body tissues and thus such data is frequently needed. In the past this has meant either spending long periods of time with inaccurate manual methods of measuring and hand-held calculators, or spending thousands of pounds on complex equipment. Now, for the first time, it's possible to use an accurate measuring system of reasonable price with BBC Micros.

Although the package we're looking at is for the Archimedes, there are versions for previous Acorn machines. For the review we used a Summagraphics Bit-pad 2 digitising tablet with cross-hair four button cursor, a 440 Archimedes – a 305 will suffice – and the Digit software.

Data is input by placing the crosshairs of the cursor on the subject on the digitising tablet and pressing a cursor button – Figure I. The image can be a photograph, a projected one or one viewed down a microscope using a drawing tube which enables you to see the digitising tablet and the microscope slide at the same time – Figure II.

When the button is pressed the tablet sends the coordinates of the crosshair position to the computer via an RS232 link at 9600 baud – with the 1.24 RS232 fix from Acorn there were no problems with data flow.

The accuracy of the cursor in relation to the origin – bottom left of the active area of the tablet – is remarkable at 0.3mm, its resolution being 0.1mm and the active area of the tablet is 26.5x26.5cm. The Digit manual gives clear instructions for setting the three banks of DIP switches inside the Bit-pad to adjust baud rate, data format and so on. The Archimedes must also be configured with the correct baud rate and data format.

Booting the disc brings up the title screen – Figure III – followed by the menu, shown in Figure IV, which allows you to select from 10 options. The first three support data input from the digitiser in different modes: As individual points, distances between two points and as a stream of coordinates comprising a shape.

Digitising points is of particular value if you want to analyse the number of occurrences of groups of different structures in an area. Each instance of the first type of object is marked by pressing the cursor button once with the crosshairs over the object.

When all occurrences of the first type of object have been input, the same is done for any subsequent groups. The data can be displayed using the histogram option, and densities calculated using area data gathered using option three.

Using the shape option is easy: After selecting a filename for the data all you do is trace round the edges using the cursor with the button held down. The end of each shape is indicated by releasing the button and moving the cursor to the

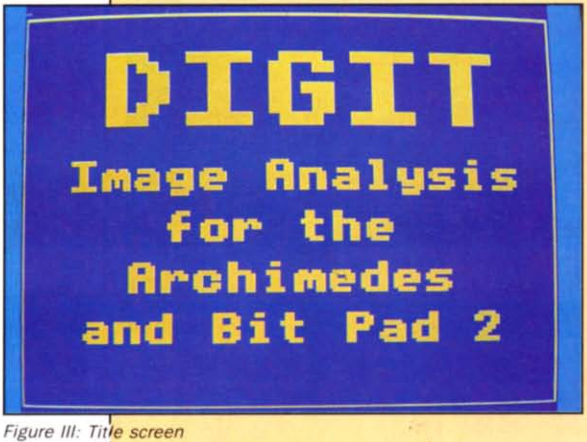
Turn to Page 46 ▶

Points for

- Low price
- Good support software
- High speed

Against

- None



```
DIGIT
Image Analysis
for the
Archimedes
and Bit Pad 2
```

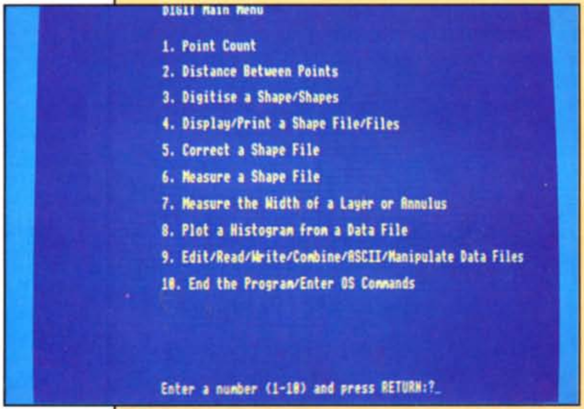
Figure III: Title screen

◀ From Page 45

strip on the right of the tablet and pressing the button once.

The micro displays the outline of the active area, the position and coordinates of the cursor and any digitised points – see Figure V. After 6,000 coordinates the machine interrupts data acquisition to store data on disc.

Option four provides the opportunity to display and print shape files. You can select a specific area and enlarge or reduce it before printing.



```
DIGIT Main Menu

1. Point Count
2. Distance Between Points
3. Digitise a Shape/Shapes
4. Display/Print a Shape File/Files
5. Correct a Shape File
6. Measure a Shape File
7. Measure the Width of a Layer or Annulus
8. Plot a Histogram from a Data File
9. Edit/Read/Write/Combine/ASCII/Manipulate Data Files
10. End the Program/Enter OS Commands



Enter a number (1-10) and press RETURN:?_
```

Figure IV: Main menu

As the input of data is so easy, a utility to correct a displayed shape is provided as option five. The file is entered, an output filename given and a comb size chosen. This selects the distance in 0.1mm increments required between two successive points before offering the second one for deletion. If you have a large number of points in the shape then editing them all – comb=1 – can take many hours.

The two most significant items available from the menu after the data input options – six and seven – allow measurements to be made on the digitised shapes. Selecting *Measure a shape*, prompts you for the filename containing the shape coordinates, for any reduction or enlargement factors and the appropriate units of length. There is an option to save one of the 20 measurements made to another file on the disc.

The shape is redrawn on the screen and the first set of 10 measurements displayed almost immediately. Although it took less than one second on an Archimedes, it needed 14 seconds on a Compact for the first shape in the demo file Britain to be displayed. After the choice of a printout you can select a further set of ten additional measurements which take a little longer to compute.

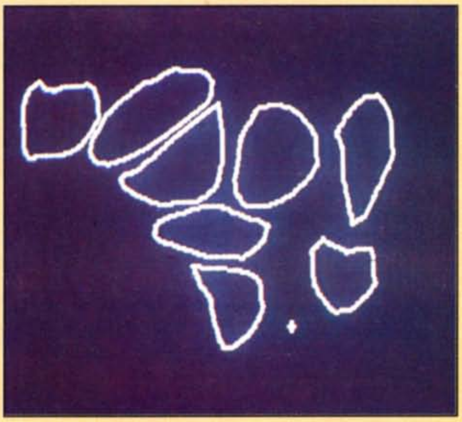


Figure V: Screen during shape data entry

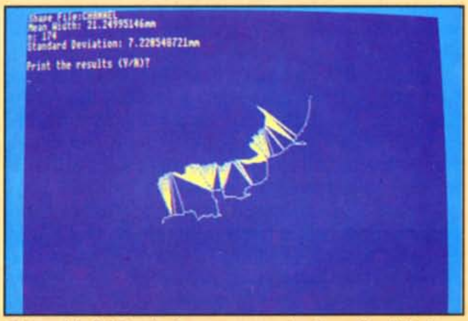
During this calculation a countdown is shown at the top of the screen, starting from 16 – it took seven seconds on the Archimedes and two minutes on the Compact, again using the Britain file. A sample printout from both sets of measurements is shown in Figure VI. The analysis then continues to the next shape in the file. Measurements are always displayed to 10 significant digits, regardless of the decimal point position.

The second measurement routine determines the minimum thickness or distance between two shapes. It accepts input from a file of two shapes which are displayed after the selection of any magnification factors and the appropriate units. The routine then takes each point on the first shape and finds the nearest point of the second shape and draws a line between the two, noting the distance.

As you might expect this takes a little time – 26 seconds for Archimedes and 4.45 minutes for Compact, using the Channel demo file. After testing every point in the first shape it displays the mean value for the measurements, the number made and the standard deviation. You can now save all the individual readings to disc.

There is also a superb histogram plotting

Turn to Page 48 ▶



```
Shape File:CHANNEL
Mean Width: 21.24995146mm
n: 174
Standard Deviation: 7.228548721mm

Print the results (Y/N)?
```

Figure VI: Printout of measurements from file Britain

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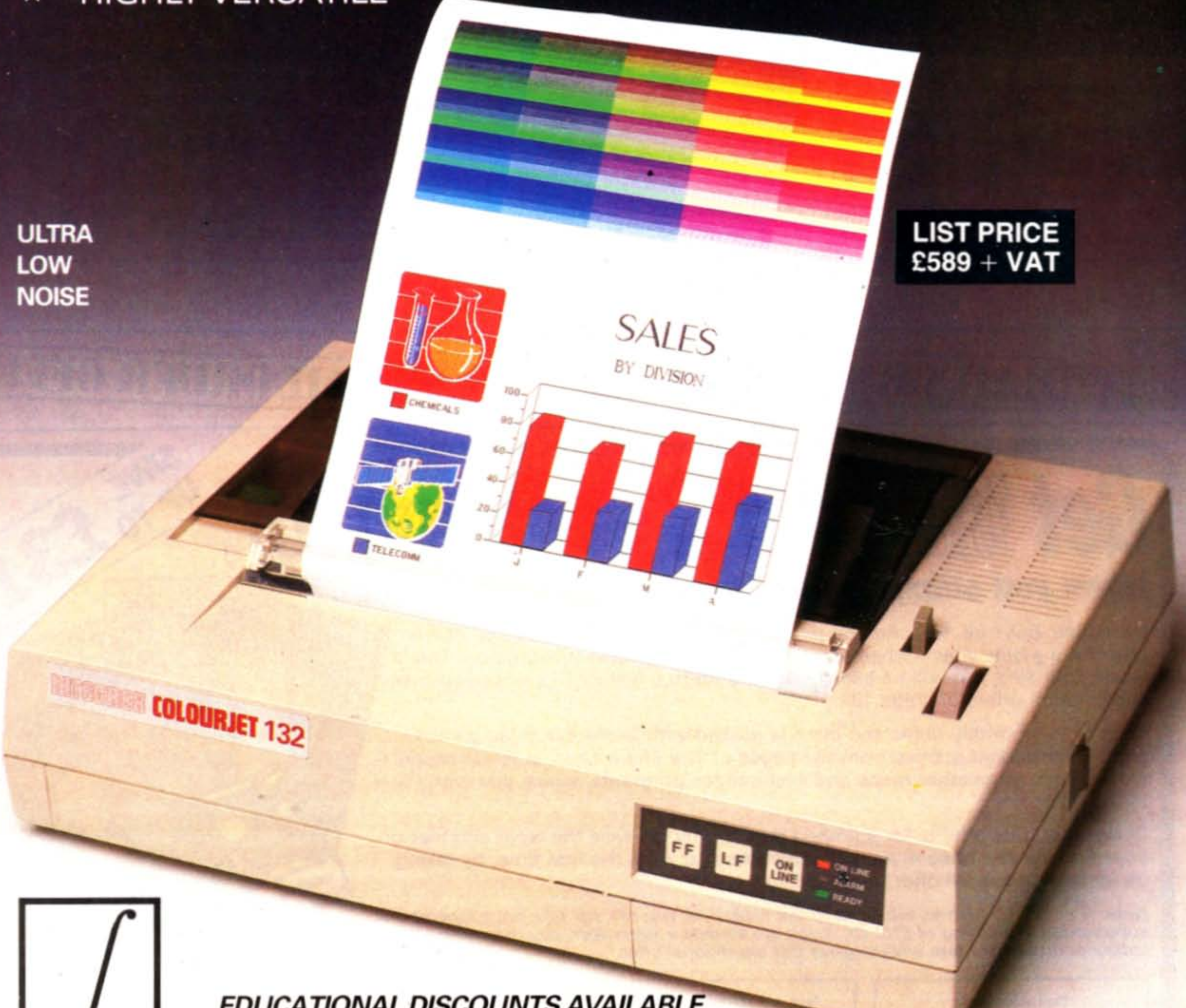
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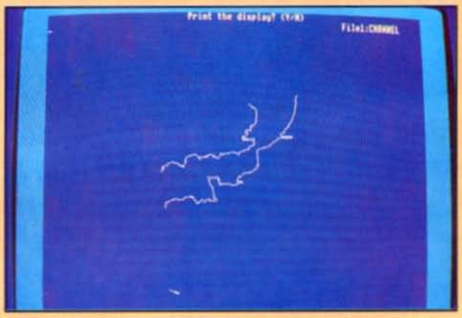
◀ From Page 46

routine which will take a stream of data from any disc file. You can choose the increments on the X and Y axes and the labels for axes or leave the Archimedes to do it for you – a printout is shown in Figure VII.

The penultimate option from the base menu permits data file editing. You can create, read and write a data file, edit it, combine it with others and convert it to true Ascii format.

Perhaps the most powerful aspect of this collection of routines is the one that allows you to do calculations on data files from within the Digit program – without much effort it is possible to do simple stats by inputting formulae. You can leave the package using option 10.



Print the display? (Y/N)

File:CHANNEL

Figure VII: Printout of histogram from file Channel

The software comes on one disc and as it is all in Basic – except a data file for reprogramming the mouse pointer symbol – it's easy to modify to suit personal requirements and the author, Brian Hayes, is willing to discuss customised versions. The manual is in A4 format, 14 pages long and gives clear instructions about use of the bit-pad and the software.

I found the system particularly easy to use, fast and accurate. It compares favourably with much more expensive systems using the same industry standard Bit-pad – which is well made and also good value for money, even at the full price of just over £500. The software is very cheap and buying the two together saves a further £100.

There are three other support packages available: Distit, 3Digit and Dismap, each selling at £50. Distit provides nearest neighbour analysis, indicating whether the two-dimensional arrangement of structures is random or grouped. 3Digit constructs three-dimensional images from digitised 2D images, and Dismap displays contour maps of particle distributions. Brian Hayes also sells a simple hardware mod – £40 – which places a yellow light emitting diode over the cursor crosshairs, making them much easier to see down the microscope with the drawing tube.

The bottom line...

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A 40 column word processor with a flexible and simple BASIC type programming language for user specific programs. On ROM for the BBC, disc for the Archimedes. BBC: £49.00 + VAT Archimedes: £20.00 + VAT

Spell-Master

A 128K spelling checker on ROM, with a 57,000 word dictionary. Can check as you type in Wordwise, Interword or View, allows creation of user dictionaries & dictionary browsing. Crossword, anagram and fuzzy checking features. A completely new version for the Archimedes, with extra features. BBC, Archimedes ROM and Z88: £51.30 + VAT. Archimedes Disc: £39.00 + VAT

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A database on ROM, based around a powerful programming language. Features of the card index program include menu operation, variable field length & number of fields per record, unlimited records, full conditional search & sort, fast search via indexes. BBC: £60.00 + VAT

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UPDATE

Teachers would welcome portables

MOVES to bring portable micros into the range of equipment available to schools could result from a survey showing the machines would be welcomed by teachers. The survey, of more than 300 teachers involved with information technology, revealed a strong demand for portables – though few can buy them because they are not yet approved or considered by most LEAs.

Organised by Cambridge Computer – manufacturer of the Z88 portable – the survey revealed that only 10 per cent of respondents already had portables – and many of these were micros on trolleys. However, 90 per cent of the teachers said there was a definite need for portable micros in schools and more than 60 per cent said they were essential.

Main benefits of portables were identified as their adaptability across the curriculum and convenience for field trips and home use.

Paul Streeter, sales manager of Cambridge Computer (0223 312216), said: "This report confirms there is a strong demand from teachers for portable micros, and it is very much in the hands of the LEAs to meet this requirement.

"Cost is no longer a barrier as prices have come down with the introduction of portable machines like the Z88 and Amstrad PPC. We are already working with two LEAs – Hertfordshire and Shropshire – which are taking portables as seriously as this survey suggests they should.

"They will be evaluating Z88s in classrooms during the current school year, and we expect more to follow their example during the next few months".

Grant boosts micro music

SIGNS are that the government's IT Education Support Grant is giving a big boost to the use of micros in the music classroom. This is thanks to the ESG allowing local education authorities to buy computer systems for music teaching and to appoint specialist IT music advisory teachers who can introduce the technology into schools.

In the first nine months of this year 23 music IT advisory teachers were appointed by LEAs around the country. One of the largest LEAs, Cheshire County, has used the ESG to appoint two music IT advisory teachers and purchase 48 music systems from Hybrid Technology (0223 316910) for selected primary and secondary schools.

The BBC Micro-based Hybrid Music System is currently the sole computer music system approved for purchase under the ESG.

It includes a music synthesiser, keyboard, Midi and integrated music software. Its unique music programming language Ample allows a wide range of additional educational materials and applications to be created by teachers and software developers.

Getting to grips with portable power

Education information

ANOTHER milestone has been achieved by the Microelectronics Information Service for Education, MISE, which is part of the Neris database.

More than 2,000 software items and publications on Neris are provided by MISE, which is operated by former MEP information officer Lynn Craig.

Her company, Creative Data (091-488 7249), has also placed bibliographical details of 75 publishers' products on Neris this year. "This is now the largest online source of software information available nationally to all those involved in education and IT", she said.

Creative Data also supplies hard copy versions of its full database – which covers reviews and information about the products of 1,000 publishers of software and books – at a cost of between £5 and £20. Negotiations are underway which may lead to the hard copy Mise data being made available through Neris.

Science aid

A PACK of four BBC Micro and Master programs has been released by BBC Enterprises to accompany the Radio 4 educational series Inside Science.

The software is designed to provide further insight into four topics covered by the radio programmes – pollution, artificial intelligence, nuclear power and plastics.

The package costs £19.95 and can be used independently of the broadcasts.

GENTLE GIANTS OF THE SEA
by
The Whale Museum
WHALE GAMES
Migration
WHALE FACTS
WHALE GAMES
BBC

Prints of whales

Shelley Gibson dives into a pack on seagoing mammals

Product: Whales Project Pack
Price: £65.00 (total – see separate list)
Supplier: Topologika, PO Box 39, Stilton, Peterborough PE7 3RL.
Tel: 0733 244682

HAVING always had an interest in these large inoffensive mammals, it was with some pleasure that I turned to this package. Fitting nicely into the school theme of The Living World, this is a complete topic package which is becoming increasing popular with the busy teacher. The pack consists of two different software discs, a set of slides with accompanying soundtrack, a teachers' handbook full of lesson plans and photo-copyable worksheets with a cassette of whale noises and songs. Further worksheets and posters will be available with the finished version.

The theme is presented from the ecological viewpoint, emphasising how whales and their relatives are becoming increasingly endangered. There is a great deal of scientific information but this is presented in a way that children of all abilities found it easy to relate to and understand. The approach avoids shock and horror tactics – something which often prevents subjects of this type being used with younger or sensitive children. Yet the message that man is driving these creatures to extinction is conveyed clearly.

The teachers' handbook provides a firm base around which to build the scheme of work. It caters for all ages from reception through to first or second year secondary, although with some adaptation this would be suitable for older children.

From a simple introduction explaining the nature and size of whales, the information explores swimming, breathing and migration, ending with pictures and descriptions of all the various species. The book is American in origin and so there are the expected problems with spelling, the description of ages ranges by grade and the units of measure are not metric. Yet on the whole the worksheets are well set out, clear and interesting. Not too much information is put on each sheet and the activities vary.

Topologika does make teachers aware of the problems of the American origin with an insertion in the front of the resource book. The company feels that the cost of producing an English version is prohibitive and unnecessary and I must agree. There is nothing in the content which cannot be cured by selective usage and a spot of typists' correction fluid, and it would be a great shame if the American text discouraged the use of this otherwise excellent production:

The excellent slide package comes from the World Wildlife Fund and the soundtrack is distinct and easily understood – it kept my class rivetted for half an hour. You have the opportunity to pause the commentary, and there is plenty of time to swop slides for those of us without an automatic projector.

The least used part of the pack was the tape of whale noises and music, but even this was used to good effect in an assembly on the subject and as a general introduction. The software kept my class occupied and entertained, despite some problems with running of it. Though most of the problems were minor they seemed daunting.

Whale Facts is the database disc and consists of indexed, easily selectable pages of information concerning the whale with pictures and descriptions of the different species – linking

Points for

- Good value
- Very varied content
- Can be used many ways

Against

- Fails with Econet

well with the quiz sheets elsewhere in the package. All pages can be easily dumped to a printer by pressing P. Every page is printed in clear type and uses simple language.

The children found it easy to find the information they needed – always opting to use the micro rather than the textbook. The most enjoyable part was being able to take away their personal copy of the information. They were also fascinated by the pictures, and made endless copies of these which they displayed in various ways. What was most impressive was the lack of a single spelling mistake – very rare for classroom databases.

The second piece of software is Whale Games which didn't go at all well with our school Econet. The simple solution is to type ?&224=&A6 before running the program which disables Econet.

The first offering is The Migration Game and is suitable for a single child or a group and tests their knowledge on whales to date. You are shown a map of the world and the various migration routes then you're asked a question and the correct answer has your whale progressing on its migration.

The Whales Project Pack is also available in its individual components:

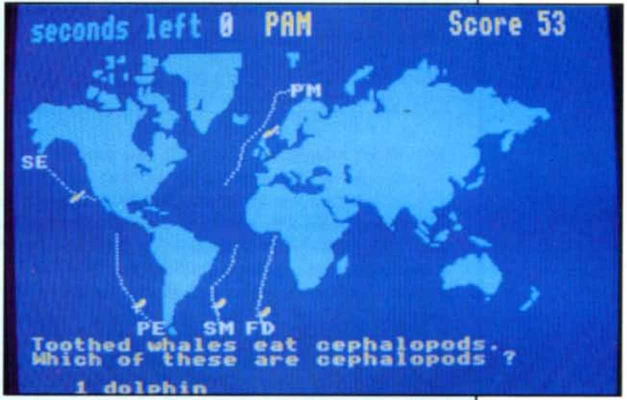
Gentle Giants – Teacher's Resource Book	*£12.95*
Oceans of Song audio tape	*£7.95*
Saving the Whale – tape/slide pack	*£13.95*
Poster – North Atlantic Whales	*£4.00*
Project Sheets	*£4.00*
Story Book – Myths & Legends	*£4.00*
Whales Games	*(disc) £14.95* *(Master compact) £16.95*
Whales Facts	*(disc) £14.95* *(Master Compact) £16.95*
Whale Adventure Game	*£18.40*

this is a new addition which will be available soon and is a re-written version of Moby Dick.

These are multiple choice questions and when you have spent as much time on reading the question as you want, pressing the spacebar will give you three possible correct answers and a time limit of 10 seconds. The quicker the response time the more points you will score. With the lower ability groups, interest was kept by speeding up the question reading time by appointing a group reader.

A nice touch is that wrongly answered questions will reappear later in the game. The first whale to reach warm water is the winner, and the results are stored for the teacher's information. The questions vary in difficulty and aspect and the provision of multiple choice answers made the less able in the class more confident to try.

The second game – Save the Whale – has you, a group of whales, a whaler, a helicopter and a conservation ship called Rainbow being the cast. The micro-controlled whaler and the helicopter are hunting the whales. The whales and Rainbow are controlled by an individual or group with the aim of getting your herd safely across the ocean. It is a simple way to improve directional skills and forward route planning while involving a lot of enjoyment by avoiding the whalers.



```
seconds left 0  PAM          Score 53
Toothed whales eat cephalopods.
Which of these are cephalopods ?
   1 dolphin
```

The migration game

As with all the games the third – Ears that See – initially asks you what noise level you require – from loud to silent – which is a nice, and very necessary touch if the micro is in the classroom proper.

The game is based on echo location and teaches the identification of line orientation, visible or invisible mathematical shapes and finally you must identify the invisible shape before being eaten by a shark. The manual stresses that these are played in order. The concept and instruction are not simple, and would probably be best left to higher ability children.

The pack is well thought out and attractively presented as a whole. The programs use pleasant and clear graphics, bold text and interesting sound effects – there is not one single annoying jingle. A wide range of ages and abilities are catered for both on and off the micro. As all the components can be bought separately this is one of the best topic packages available.

The bottom line ...

An excellent product that deserves wide use

A sample slide from the resources pack

Taking stock

Phil Tayler reviews a package aimed at City and Guilds IT students

Product: Inside Information
Price: £41.35
Supplier: BBC Soft, PO Box 234, London SE1 3TH.
Tel: 01-576 2548

INSIDE Information is the title of a pack of learning materials containing software and text introducing you to information technology. It is aimed at the City and Guild Certificate course No 444, Inside Information, which is itself also aimed at those wanting a general introduction to IT, so the software could be used as part of any course on this subject.

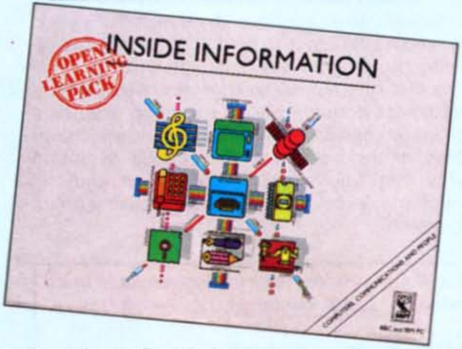
The pack includes two audio cassettes containing four 35 minute programmes from the 1985 Radio 4 series, Inside Information. It is here that the basic problem lies – in the date. This package, though new, contains information current three years ago. The spoken commentary refers to acoustic couplers which are seldom used nowadays and the book claims that *"MSX is too recent for anyone to be sure whether it will become the world standard for 8 bit micros..."* Well, it didn't.

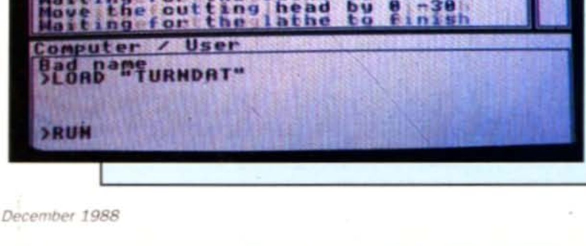
It is presented by Paul Heiney and many of the important aspects of IT are raised and covered, such as how micros work, the applications to which they are put and the impact of the electronic office. This is accompanied by an easy to read software manual, a student guide and a softback book by computer journalist Jacquetta Megarry. Having no particular flag to wave, she has written an eminently readable book covering in broader terms the same areas as the other material.

Software is provided in both BBC Micro DFS and MSdos formats with fairly minor differences between the two.

The description of applications of IT are interesting and vary from archaelogical records to radio programmes. Paul Heiney enlists the help of a wide range of IT users and creates an easy to listen to commentary. My favourite quote is: *"If you can kick it, it's hardware"*.

When you come to the software it is important to remember that the intention is not to present state of the art examples, but to demonstrate how the micro handles text. The word processing section is cumbersome and I found it confusing. However the TextDem program is more worthwhile as it shows how a typist would correct an error-ridden piece of writing.





```
Lathe Rotating; X=11; Z=1;                    Int

Computer / Lathe
Waiting for the lathe to finish
Move the cutting head by -1 0
Waiting for the lathe to finish
Move the cutting head by 0 -30
Waiting for the lathe to finish

Computer / User
Bad name
>LOAD "TURNDAT"


>RUN
```

I also found other sections to be flawed: LidOff for example is written to show how a micro copes with keyboard input as direct commands or as a line of programming. Unfortunately abbreviations of keywords are not recognised and several structures such as FOR..NEXT loops are not implemented. The manual only lists a meagre 11 commands with which it can deal, but this hardly underlines the power of modern micros.

LidCalc and LidData are simple examples of a spreadsheet and database respectively and are more useful than the word processor. The programs are supplied with sample data files so that you can experiment. Though these programs are not fast or powerful they do show on screen what is happening inside your machines.

The spreadsheet option has been set up to show the effects of double glazing and carpets on heat loss from a living room. Though interesting, a more flexible context-free spreadsheet would have permitted more investigation.

The database does include this flexibility and a sample file concerning employees is included should you need it. The process of sorting data is deliberately slowed to demonstrate the algorithm used or conditional searches can be made. I was pleased that AND, OR and NOT are all implemented in the search conditions, thus the program is genuinely interesting to work with. Your results can be printed out in a variety of formats and this program is far superior to any of the others on the disc.

The last sample program is LidTurn, which includes a simple implementation of a lathe as an example of the way in which micros can control machines.

This is not a package for the casual buyer, though the book is well worth reading and will surely have a wide audience. However, I could only recommend the entire package to students considering the City and Guilds course.

Points for

- **Very useful for C&G students**
- **LidData program is very good**

Against

- **Some data is outdated**

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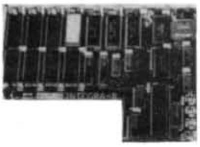

The INTEGRA-β provides four operation modes - as standard Beeb or with shadow Ram and emulation of 'B+' and Master 128 features. Ideal for educational, commercial and data collection applications, as well as the private user.

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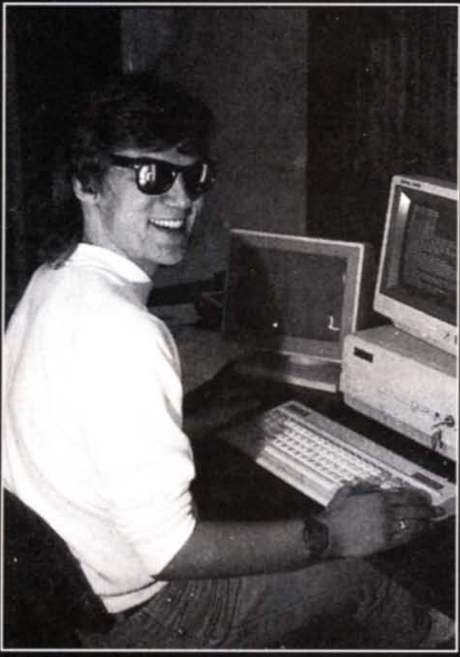
Off to see the Wizard

Neils Reynolds on the man behind Shades



Neil Newell: Arch wizard at work

DEEP in the wooded wilds of Southern England, far beyond the Stockbroker Belt where no Yuppie has ever ventured, lives a mysterious being who has created a strange and mystical land. He is the Arch Wizard Hazeii – adopting the name of Neil Newell for everyday use – and the land is Shades.

No longer a figment of his imagination, Shades has been made accessible to any mere mortal who has the use of a telling bone, a modem and who is enrolled in the fabled society of MicroLink, Micronet and Telecom Gold.

The Arch-Wizard first became interested in multi-user adventures when he encountered the original MUD game running on a mainframe at Essex University.

However, he soon felt that the game could be improved in many areas, and what started as a hobby was soon taking up all his time. So it was that the Land of Shades came into being and mild-mannered Neil Newell became Hazeii, Arch Wizard.

Shades is a vast sprawling landscape where lost souls, knights, wolves, witches and wizards prowl looking for treasure or trouble – or both. You create your own personality within the game, travelling through the mysterious kingdom, forging alliances and fighting battles in your quest for treasure.

You strive to work your way through 13 ranks of Innocents, Soothsayers, Necromancers and Warlocks until you attain the rank of Wizard or Witch – depending on your inclination.

In this true multi-user game, other travellers you meet in Shades may be computer generated, but are more likely to be insomniacs attached to a telephone line anywhere in the country. The character you are talking with could be your next door neighbour or a lighthouse keeper in the Orkneys – players have been known to log on from Europe and even New Zealand.

There is no denying the party atmosphere of Shades. Even those who are not accomplished adventurers can enjoy the game, talking to other players, acting out fantasies or just getting used to the game at their own pace. Help can be asked of fellow travellers, but then you are never sure whether their advice can be relied upon...

There is much on offer to serious adventurers too with brain-curdling problems to solve, a whole babble of beasties and nasty characters to deal with and promotions to achieve – by fair means or foul.

So the adventure does not become too crowded and all players have a good opportunity at treasure-grabbing, up to 16 independent games can be running at one time and you can choose which of them to join.

You are also told who is playing in which game, so that if you have an especially good relationship with another player – or a vendetta to pursue – you can join it, if there's room.

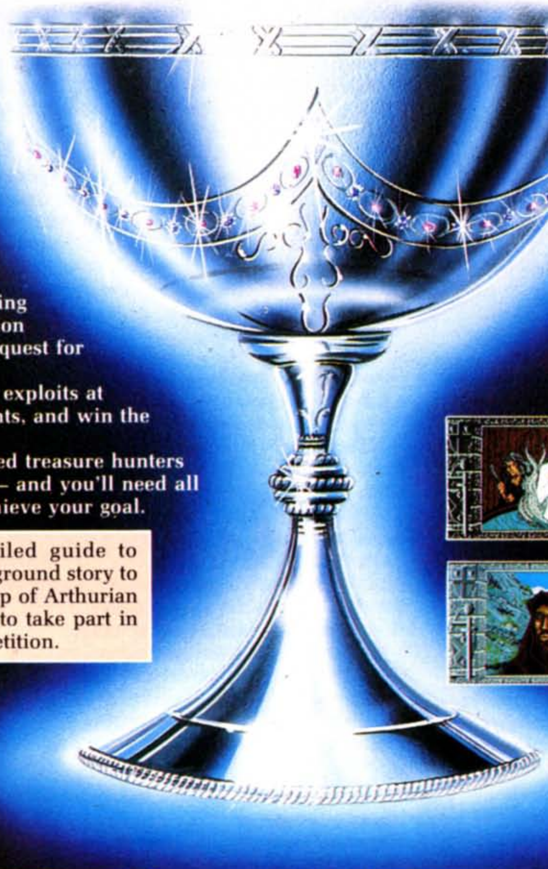
Starting out is made easy for the novice by a special introduction area. This leads you into the game with a full information centre about the Land of Shades. Progressing through this you eventually arrive in the Land proper and your quest begins.

Shades currently has a user base of more than 6,000 players. Of these only 40 have achieved the ultimate rank of Wizard – they are given special powers and privileges so they can then directly affect the game themselves.

Indeed, even the all-powerful Hazeii himself treads the paths of the Land (sometimes invisibly) and his wrath is said to be terrible if roused by those with ideas above their station.

The Fantasy is constantly under development and new locations are currently being designed and built into the game as the Arch Wizard concocts ever more fiendish devices to entrap the unwary travellers in the Land of Shades.

Shades is available on:
MicroLink/T.Gold...................... key >Shades
*Micronet/Prestel..................... key *Shades#*



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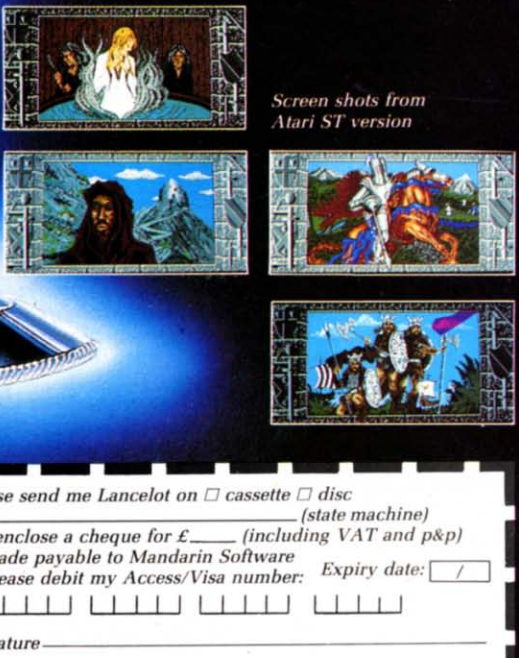

Screen shots from Atari ST version

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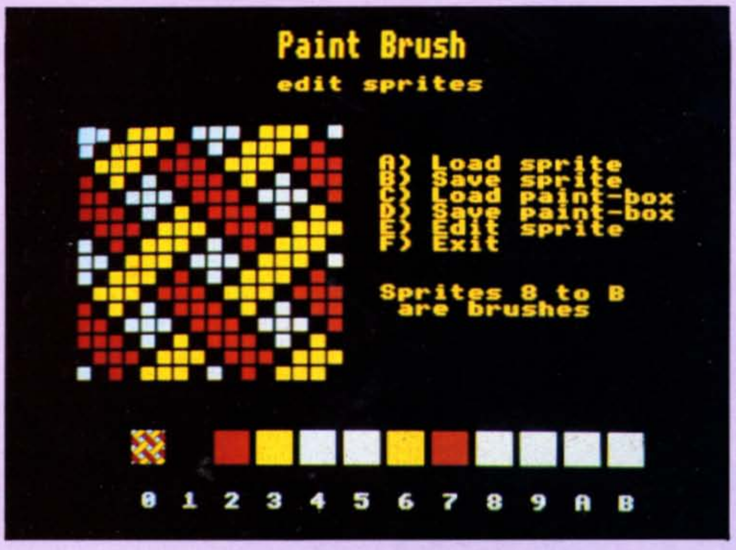


Paint Brush
edit sprites

A) Load sprite
B) Save sprite
C) Load paint-box
D) Save paint-box
E) Edit sprite
F) Exit

Sprites 8 to B
are brushes

0 1 2 3 4 5 6 7 8 9 A B

Brush up on your colour

Rob Anderson gives your micro a can of patterned paint

ONE of the most practical features of CAD systems is the paint brush which enables pixels – points of colour – to be plotted on to a graphics screen with as little fuss as possible. Brush is a program that allows any user-defined pattern to be painted across a Mode 1 screen using a specified brush shape.

However, the pattern is not simply thrown on to the screen wherever the brush happens to be, but it is scrolled with the brush, giving a consistent pattern which always joins up no matter where the brush goes. In fact it acts as if you've got a can of patterned paint.

There is also a special feature to randomise the pixels of paint enabling shading and speckling effects to be created. And an editor is also included so that you can design your own patterns and brushes.

There are two programs to type in: Source – which creates the machine code screen handling routines – and Brush itself. Type in each separately and ensure you've made no typing errors with Get it Right! Run Source to generate a file called PatObj, then you can run Brush.

The main menu gives you three options: Screen editing, pattern/brush editing or ending the program. Selecting option 1 prompts you for the Mode 1 screen filename to be edited. If you have no screens available you can create a blank one easily from Basic by typing:

```
MODE1:*SAVE screen1 3000 8000
```

before using Brush. And incidentally, whenever a filename is asked for you can issue a star command instead by prefixing the string with an asterisk – this is useful for checking disc catalogues.

You must also enter the filename under which the edited screen will be saved. The source screen is loaded and a destination file saved immediately to make sure there is room on the disc to hold the altered version. A square brush appears and the controls in this mode are shown in the panel on the left – notice that holding down the control key will speed up the brush movement.

There is a pull-down menu – selected with M – which allows you to select different patterns by pressing key 0 to 7 or a new brush with 8 to B. After choosing a brush it is possible to randomise its pixels by pressing R immediately after selection.

While in the menu a continuous sound – with pitch directly related to the brush speed – is produced and you can alter it using the up and

Turn to Page 60 ►

Left cursor or Z	Brush moves left
Right cursor or X	Brush moves right
Up cursor or :	Brush moves up
Down cursor or /	Brush moves down
Control	Double movement speed
Shift	Spray pattern
M	Select pull-down brush and pattern menu
f0	End edit

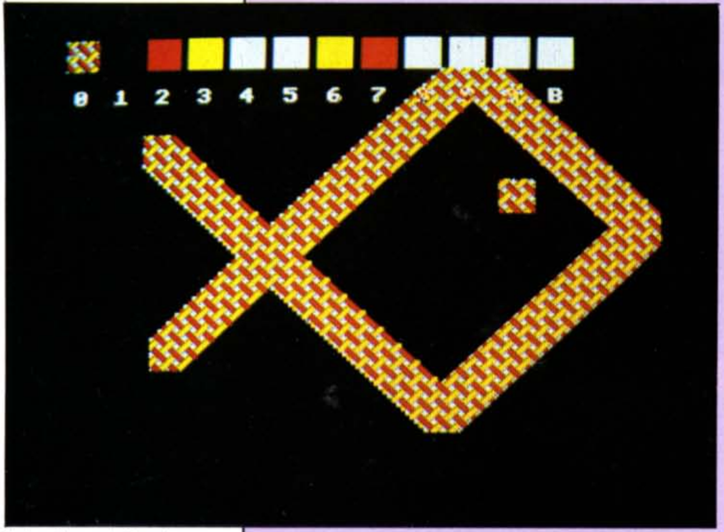
Screen editing controls

COMPATIBILITY

If you are using a Master series machine you should set:

```
PAGE=&1900
```

before running either Source or Brush and any shadow memory should be switched off. Neither program will work successfully across the Tube and so won't function on the Archimedes 6502 Emulator.



Using the paintbrush

◄ From Page 59

down cursor keys. Press M to exit the menu.

Once you've finished editing your screen just press function key 0 to save the file and return to the main menu.

The default patterns and brushes can be altered using the editor from option 2 of the main menu. Once in this a blown-up version of the currently selected brush or pattern is shown. The controls for this option are given in the panel above.

Cursor keys	Move pixel highlight
0..3	Select colour
A	Load single sprite
B	Save single sprite
C	Load all sprites
D	Save all sprites
E	Select different sprite
F	Exit to main menu

Sprite editing controls

It's a good idea to save single brushes or patterns under one directory and complete sets – paint boxes – under another to avoid confusion when reloading the files.

Sprites 8 to B are the brushes and should only contain white pixels. But no checks are made to ensure this and some unusual and unpredictable spray effects can be created by using non-white colours in them. Pattern sprites saved using option B should not be re-loaded at a brush position and vice versa – although it does no harm.

So there you have it, an expert paint system on your BBC Micro. If you produce any interesting pictures using it we'd love to see them.

Listing I

```
   10 REM Paint Brush Source Code
   20 REM by Rob Anderson
   30 REM (c) The Micro User
   40 s%=&1100:p%=0
   50 PROCpatterns
   60 PROCbrushes
   70 PROCasscode
   80 PROCcli("SAVE PATOBJ "+STR$~s%+" "
+STR$~P%)
   90 END
  100 DEFPROCpatterns
  110 FOR A%=0 TO (4*16)-1
  120 READ s%?p%:p%=p%+1:NEXT
  130 DATA &DC,&D1,&DC,&D1,&B8,&82,&B8
  140 DATA &82,&70,&07,&70,&07,&28,&8B
  150 DATA &28,&8B,&1D,&CD,&1D,&CD,&0E
  160 DATA &A8,&0E,&A8,&07,&70,&07,&70
  170 DATA &8A,&E0,&8A,&E0
  180 DATA &DC,&D1,&DC,&D1,&B8,&82,&B8
  190 DATA &82,&70,&07,&70,&07,&28,&8B
  200 DATA &28,&8B,&1D,&CD,&1D,&CD,&0E
  210 DATA &A8,&0E,&A8,&07,&70,&07,&70
  220 DATA &8A,&E0,&8A,&E0
  230 FOR L%=1 TO 7:READ B%
  240 FOR A%=0 TO (4*16)-1
  250 s%?p%=B%:p%=p%+1:NEXT:NEXT
  260 DATA &00,&0F,&F0,&FF,&FF,&F0,&0F
  270 ENDPROC
  280 DEFPROCbrushes:PROCset(5*16*4,&00)
  290 FORA%=1TO4:PROCset(5*16,&FF):NEXT
  300 FORA%=&1444TO&1580STEP5:?A%=0:NEXT
  310 ENDPROC
  320 DEF PROCset(N%,B%)
  330 LOCAL A%:FOR A%=0 TO N%-1
  340 s%?p%=B%:p%=p%+1:NEXT:ENDPROC
  350 DEFPROCasscode
  360 mskxsz=&70:mskysz=&71
  370 mskxpos=&72:mskypos=&73
  380 mskL=&75:mskH=&76
  390 scrnL=&77:scrnH=&78
  400 wkL=&79:wkH=&7A
  410 ptnL=&7B:ptnH=&7C
  420 xlop=&7D:ptnwrap=&7E
  430 patindent=&7F
  440 patxsz=&80:patysz=&81
  450 tpatL=&82:tpatH=&83
  460 ptnywrap=&84
  470 patstartL=&85:patstartH=&86
  480 rnd1=&87:rnd2=&88:rnd3=&89
  490 rnd4=&8A:rnd5=&8B:rnd6=&8C
  500 rnd7=&8D:rnd8=&8E:rnd9=&8F
  510 FOR L%=0 TO 2 STEP2
  520 P%=s%+p%:[OPT L%
  530  JMP ptnplot
  540  JMP eorplot
  550  JMP scrntomem
  560  JMP backplot
  570  JMP clone
  580  JMP rndpatplot
  590 .rndpatplot:LDY #0
  600 .rndlp3:TYA:PHA:TXA:PHA
  610  JSR random:PLA:TAX:PLA:TAY
  620  LDA rnd9:AND #&0F:STA rnd9
  630  ASL A:ASL A:ASL A:ASL A
  640  ORA rnd9:AND (mskL),Y
  650  STA &18B0,Y:INY:CPY #&50
  660  BNE rndlp3:LDA #&B0:STA mskL
  670  LDA #&18:STA mskH
  680 .ptnplot
  690  LDA mskypos:PHA:LDA mskL
  700  PHA:LDA mskH:PHA:JSR getaddr
  710  LDX mskysz:LDY #0
  720 .ylp:LDA patindent:STA ptnwrap
  730  LDA ptnL:CLC:ADC patindent
  740  STA tpatL:LDA ptnH:ADC #0
  750  STA tpatH:LDA #0:STA xlop
  760 .xlp
  770  TYA:PHA:LDA (mskL),Y:EOR #&FF
  780  LDY #0:AND (scrnL),Y
  790  STA (scrnL),Y:PLA:TAY:PHA
  800  LDA (mskL),Y:LDY #0
  810  AND (tpatL),Y:EOR (scrnL),Y
  820  STA (scrnL),Y:PLA:TAY:LDA xlop
  830  CLC:ADC mskxpos:CMP #79
  840  BCS dontadd:LDA scrnL:CLC
  850  ADC #8:STA scrnL:BCC nocarry
  860  INC scrnH
  870 .nocarry:JMP boundchk
  880 .dontadd:LDA #&80:STA scrnH
  890  LDA #0:STA scrnL
  900 .boundchk
  910  INC tpatL:BNE nocarry2:INC tpatH
  920 .nocarry2:INC ptnwrap:LDA ptnwrap
  930  CMP patxsz:BNE nowrap:LDA ptnL
  940  STA tpatL:LDA ptnH:STA tpatH
  950  LDA #0:STA ptnwrap
  960 .nowrap
  970  INY:INC xlop:LDA xlop:CMP mskxsz
  980  BNE xlp:INC mskypos:BEQ out
  990  JSR getaddr:LDA ptnL:CLC
 1000  ADC patxsz:STA ptnL:LDA ptnH
 1010  ADC #0:STA ptnH:DEC ptnywrap
 1020  BNE noywrap:LDA patstartL
 1030  STA ptnL:LDA patstartH:STA ptnH
 1040  LDA #254:STA ptnywrap
```

Turn to Page 62 ►

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```
1050 .noywrap:DEX:BEQ out:JMP ylp
1060 .out:PLA:STA mskH:PLA:STA mskL
1070  PLA:STA mskypos:RTS
1080 .eorplot:LDA mskypos:PHA:LDA mskL
1090  PHA:LDA mskH:PHA:JSR getaddr
1100  LDX mskysz
1110 .blp2:LDY #0
1120 .blp1:TYA:PHA:LDA (mskL),Y:LDY #0
1130  EOR (scrnL),Y:STA (scrnL),Y
1140  PLA:TAY:LDA scrnL:CLC:ADC #8
1150  STA scrnL:BCC bnocar:INC scrnH
1160 .bnocar:INY:CPY mskxsz
1170  BEQ endxeor:TYA:CLC:ADC mskxpos
1180  CMP #80:BCS endxeor:JMP blp1
1190 .endxeor:LDA mskL:CLC:ADC mskxsz
1200  STA mskL:LDA mskH:ADC #0
1210  STA mskH:INC mskypos:BEQ eorout
1220  JSR getaddr:DEX:BNE blp2
1230 .eorout:PLA:STA mskH:PLA:STA mskL
1240  PLA:STA mskypos:RTS
1250 .scrntomem:LDA mskypos:PHA
1260  JSR getaddr:LDX mskysz
1270 .slp2:LDY #0
1280 .slp1:TYA:PHA:LDY #0
1290  LDA (scrnL),Y:STA wkL:PLA:TAY
1300  LDA wkL:STA (mskL),Y:LDA scrnL
1310  CLC:ADC #8:STA scrnL:BCC snocar
1320  INC scrnH
1330 .snocar:INY:CPY mskxsz:BNE slp1
1340  LDA mskL:CLC:ADC mskxsz
1350  STA mskL:LDA mskH:ADC #0
1360  STA mskH:INC mskypos:JSR getaddr
1370  DEX:BNE slp2:PLA:STA mskypos:RTS
1380 .backplot:LDA mskypos:PHA
1390  JSR getaddr:LDX patysz
1400 .backlp2:LDY #0
1410 .backlp1:TYA:PHA:LDA (mskL),Y
```

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```
1420  STA wkL:LDY #0:LDA (scrnL),Y
1430  STA wkH:LDA wkL:STA (scrnL),Y
1440  PLA:TAY:LDA wkH:STA (mskL),Y
1450  LDA scrnL:CLC:ADC #8:STA scrnL
1460  BCC backnocar:INC scrnH
1470 .backnocar
1480  INY:CPY patxsz:BNE backlp1
1490  LDA mskL:CLC:ADC patxsz
1500  STA mskL:LDA mskH:ADC#0:STA mskH
1510  INC mskypos:JSR getaddr:DEX
1520  BNE backlp2:PLA:STA mskypos:RTS
1530 .getaddr
1540  LDA #0:STA wkL:STA wkH:STA scrnL
1550  STA scrnH:LDA mskypos:AND #&F8
1560  LSR A:LSR A:STA wkH:LSR A:LSR A
1570  PHP:CLC:ADC wkH:STA wkH:PLP
1580  ROR wkL:LDA mskypos:AND #7:CLC
1590  ADC wkL:STA wkL:LDA #&30:ADC wkH
1600  STA wkH:LDA mskxpos:STA scrnL
1610  ASL scrnL:ROL scrnH:ASL scrnL
1620  ROL scrnH:ASL scrnL:ROL scrnH
1630  CLC:LDA scrnL:ADC wkL:STA scrnL
1640  LDA scrnH:ADC wkH:STA scrnH:RTS
1650 .clone:LDY #0
1660 .clp1:LDA (mskL),Y:STA &1300,Y
1670  INY:CPY #&50:BNE clp1:LDA #&00
1680  STA wkL:LDA #&13:STA wkH
1690  LDA #&50:STA mskL:LDA #&13
1700  STA mskH:LDX #&30
1710 .clp2:LDY #4
1720 .clp3:CPY #0:BNE carryavail
1730  LDA #0:STA xlop:JMP shift
1740 .carryavail
1750  DEY:LDA (wkL),Y:AND #&11:ASL A
1760  ASL A:ASL A:STA xlop:INY
1770 .shift:LDA (wkL),Y:LSR A:AND #&77
1780  ORA xlop:STA (mskL),Y:DEY
1790  BPL clp3:LDA wkL:CLC:ADC #5
1800  STA wkL:LDA wkH:ADC #0:STA wkH
1810  LDA mskL:CLC:ADC #5:STA mskL
1820  LDA mskH:ADC #0:STA mskH:DEX
1830  BNE clp2:RTS
1840 .random:LDY #8
1850 .rndlp1:CLC:LDA rnd8
1860  BPL zerobitrnd:LDX #2
1870 .rndlp2
1880  LDA rnd5,X:EOR rnd1,X:STA rnd5,X
1890  DEX:BPL rndlp2:SEC
1900 .zerobitrnd
1910  ROL rnd5:ROL rnd6:ROL rnd7
1920  ROL rnd8:DEY:BNE rndlp1:LDA rnd8
1930  AND #&07:CMP #5:BCC inrange
1940  LDA #0
1950 .inrange
1960  TAX:LDA table,X:STA rnd9:RTS
1970 .table OPT FNds(5)
1980 ]:NEXT:?table=&00
1990 table!1=&08040201:ENDPROC
2000 DEF FNds(N%):P%=P%+N%:=L%
2010 DEFPROCcli($&700):LOCALX%,Y%
2020 Y%=7:CALL &FFF7:ENDPROC
```

Get it right!

```
  10 =    0 0
  20 =    0 0
  30 =    0 0
  40 = 186B B
  50 = 8BEA C
  60 = B097 1
  70 = 3FC1 1
  80 = 8CA2 8
  90 = FD2E 6
 100 =  169 C
 110 = D6BB F
 120 = E078 8
 130 = 9998 8
 140 = B4FF 8
 150 = D1EA D
 160 = FC47 8
 170 = 23AF B
 180 = 9998 5
 190 = B4FF 4
 200 = D1EA 2
 210 = FC47 8
 220 = 23AF F
 230 = F3E4 8
 240 = D6BB 3
 250 = D21D 7
 260 = 56EA D
 270 = ED0F 2
 280 = 3106 4
 290 = EE9C 1
 300 = 91BE 0
 310 = ED0F F
 320 = 6B5F F
 330 = 9133 6
 340 = 1391 C
 350 = D267 B
 360 = 5027 B
 370 = 3252 1
 380 = 8B08 9
 390 = D06F 5
 400 = B5C3 8
 410 = C07E 0
 420 = C566 E
 430 = 485D D
 440 = 85B6 9
 450 = 4991 D
 460 = 3ACB 1
 470 = 51AC D
 480 = 6866 9
 490 = 3B3F 7
 500 = 462B 6
 510 = 905A B
 520 = 49AB F
 530 = 53D6 D
 540 = 4B5D 6
 550 = 4AD9 B
 560 =  AE1 4
 570 = 8DF8 8
 580 = EC95 2
 590 = 7DDB 6
 600 = 4DA3 E
 610 = 8ED7 3
 620 = BF0F 1
 630 = 8C08 9
 640 = A5A1 D
 650 = BB38 F
 660 = A1D1 0
 670 =  51F D
 680 = 7D29 A
 690 = 5E4C 7
 700 =  FA5 E
 710 = 8CE5 D
 720 = 32CC F
 730 = 8838 4
 740 = 6D34 4
 750 = A845 2
 760 = D46D A
 770 =  3CA 0
 780 = A10D 4
 790 = 47E5 1
 800 = 43C3 D
 810 = 7B04 C
 820 = 74F0 9
 830 = 23B6 E
 840 = 697C 5
 850 = 21C2 E
 860 = A379 B
 870 = 68F3 9
 880 = 6678 B
 890 = EFE0 3
 900 = 31D9 6
 910 = C346 2
 920 = 99AE B
 930 = 18A0 B
 940 = 65D5 7
 950 =  86C 8
 960 = 1C5C 0
 970 = 564C A
 980 = BC2F 7
 990 =  5B5 F
1000 = 4126 4
1010 = 5230 C
1020 = 45E4 9
1030 = 370A 3
1040 = 8925 1
1050 = 8054 5
1060 = 119F D
1070 = 3EE7 C
1080 = 232D 0
1090 =  FA5 F
1100 = 8C96 B
1110 = C8D0 3
1120 = CF6D 5
1130 =  727 2
1140 = C7D9 2
1150 = 3CB8 E
1160 = C075 B
1170 = 977C C
1180 = 1C69 3
1190 = 8316 1
1200 = EC73 3
1210 = 9816 E
1220 = B80F 4
1230 = 6494 3
1240 = 3EE7 0
1250 = AFD4 F
1260 = 25A1 4
1270 = 45A4 9
1280 = 32F5 6
1290 = 6DC3 B
1300 = 34CA 2
1310 = 6413 C
1320 = A379 6
1330 = 3593 4
1340 = 35BB E
1350 = EC73 3
1360 = DC99 2
1370 = 8BBE F
1380 = CDC1 D
1390 = FEF6 E
1400 = 640D C
1410 = 4F8C A
1420 = 60E2 9
1430 = C126 7
1440 = 224C 6
1450 = E80B 5
1460 = 9CC7 F
1470 = FC4F B
1480 = 7A67 C
1490 = EEEC 4
1500 = 7F02 F
1510 =  67D 4
1520 = 70CD C
1530 = 3648 5
1540 = C853 A
1550 = D28D 9
1560 = 8984 D
1570 = 775A D
1580 = 89E1 4
1590 = 2A39 E
1600 = 2E7F F
1620 = 88B9 2
1630 = 14B0 1
1640 = CE7D 7
1650 = 6780 2
1660 = 9938 1
1670 = A316 4
1680 = DB78 2
1690 = 17CE A
1700 = BBB4 C
1710 = 501D A
1720 = CB44 A
1730 = FA0A 4
1740 = A02A E
1750 = E018 8
1760 = 7466 2
1770 = CE50 D
1780 = 6ECA 6
1790 = C3A7 3
1800 = 21BC 6
1810 = B002 4
1820 = 69D5 2
1830 = AEDF 0
1840 = 71FC F
1850 = 1F9E 2
1860 = C99B D
1870 = 27B7 1
1880 = 6D7C 3
1890 = FAE2 E
1900 = 64E3 C
1910 = F33E 4
1920 =  649 3
1930 = 2682 8
1940 =  295 C
1950 = FAA3 3
1960 = 9737 5
1970 = CB58 3
1980 = 62A6 E
1990 =  45C 6
2000 =  532 D
2010 =   85 6
2020 = DB66 5
```

Listing II

```
  10 REM Paint Brush
  20 REM by Rob Anderson
  30 REM (c) The Micro User
  40 HIMEM=&3000:*LOAD PATOBJ 1100
  50 ONERRORPROCerr
  60 PROCinit
  70 REPEAT
  80 PROCdisplay:*FX15
  90 REPEAT opt$=GET$
 100 UNTIL INSTR("123",opt$)>0
 110 IFopt$="1"PROCedscrn
 120 IFopt$="2"PROCedit
 130 UNTILopt$="3":*FX4,0
 140 MODE7:VDU23,1,1;0;0;0;:END
 150 DEFPROCerr:VDU7
 160 PRINT"Error:";:REPORT:PRINT"Any
key to continue"
 170 REPEATUNTILGET:ENDPROC
 180 DEFPROCinit:DIM C 9:*FX4
 190 ?&70=5:?&71=16:?&80=4:?&81=16:ptpl
t%=&1580:eorplt%=&1583
 200 scrmem%=&1586:bckplt%=&1589:cl%=&1
58C
 210 VDU23,255,0,&7E,&7E,&7E,&7E,&7E,&7
E,0;23,254,&FF,&81,&81,&81,&81,&81,&81,&
FF
 220 !&87=&53B57677:?&8E=3:ENDPROC
 230 DEFPROCdisplay
 240 VDU22,7;23,1,0;0;0;0;:RESTORE280
 250 FORA%=0TO1:VDU31,9,A%,141,132,157,
131:PRINT"Paint Brush  "CHR$156:NEXT
 260 FORA%=1TO3:READA$:PRINTTAB(7,3+A%)
```

Turn to Page 65 ►

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MU12

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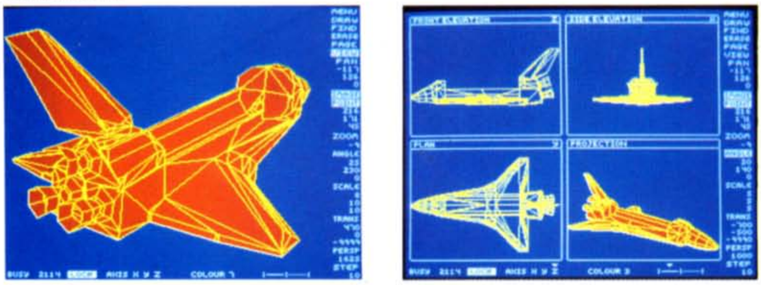

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REALTIME SOLIDS MODELLER

The package includes both the sophisticated design environment of SolidCAD and the high speed animation capability of a Realtime Graphics Language (RGL) module developed in pure ARM Risc code for supercharged performance. The package is ideal for Architectural design, Interior design, Engineering design & teaching CDT. The RGL module can be used to create standalone flicker-free animation of designs from your own programs. Smooth shading is also performed for realistic images. Through our in-house expertise in 3D Design and High-speed techniques, no other package can rival the design environment & animation speed of the Realtime Solids Modeller.

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The Realtime Graphics Language rom provides a complete 3D Solids/Wireframe animation system with 52 star commands and 3D Editors for designing objects to animate from your own programs. Includes a 35,000 pixels / sec line generator for fast 3D drawing rates, 3D Rotate, Scale, Orbit, Perspective and Turtlegraphics. Also compatible with designs created with SolidCAD (BBC).

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The ultimate printer driver which takes advantage of the highest resolution capability of ordinary Epson compatible printers to provide 1920 × 1024 resolution. Images can also be scaled, positioned and previewed before printing. Fully compatible with SolidCAD, Realtime Graphics Language, Gate-Array design system & 3D CAD/Animation system. Your own graphics programs or other CAD packages can be made compatible with Super-Dump by the addition of a few simple commands. An example program is included in the package.

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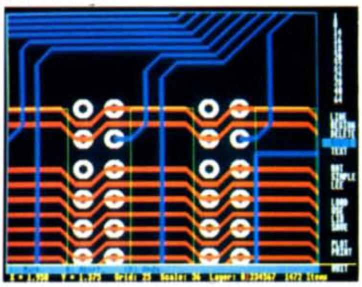
ARC-PCB



The ultimate PCB design system developed specifically for the Archimedes with a specification that cannot be matched. Includes Automatic routing, Rats-nesting, 8 layers, Surface mount capability, 0.001" resolution, 32" × 32" maximum board size, On-line Help, Fast Zoom/Pan/Redraw, Text & Silkscreen facility, Variable Line/Pad/Text/Grid sizes, Part Libraries, Block Move/Copy/Rotate/Mirror/Erase options, and up to 300,000 components. For hardcopy, the system supports a large number of plotters and ordinary Epson compatible printers at very high resolutions (1920 × 1024) of 240 dots/inch for near laser quality output. An entry-level ARC-PCB system (without auto-routing) is available for £99.95 (Auto-routing upgrade: £100). Enquire about our turnkey PCB design systems complete with Colour Archimedes and/or plotters with prices from £1220 to £3909 (Inc VAT).

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RiscBASIC

Supercharge your Archimedes Basic programs by compiling them automatically into pure ARM Risc code with the RiscBASIC compiler. Features include Relocatable modules, Cross reference of all variables, functions, and procedures, Floating point and Integer support, Stand alone code generator, Optimising compiler & Full runtime error handler.

£99.95 (ARC) New

RiscFORTH

A new 32-bit implementation of the FORTH-83 standard, designed to take full advantage of the ARM architecture. Features include Multi-tasking, Optimising compiler, built-in ARM assembler with floating point mnemonics, built-in Full screen Editor, File system interface, OS calls support, Floating point & Integer maths, WIMP support, Single-step debugger, Shadow screen for documentation, Block manipulation, Dictionary & Vocabulary display, Call finding and a standalone code generator.

£99.95 (ARC) New

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```
CHR$131;A%") "A$:NEXT
  270 PRINTTAB(7,A%+4)CHR$134"Enter opti
on":VDU28,0,24,39,A%+5
  280 DATA Edit screen,Edit sprites,Exit
  290 ENDPROC
  300 DEFPROCedscrn
  310 sfile$=FNfile("source"):dfile$=FNf
ile("destination")
  320 VDU22,1;23,1,0;0;0;0;
  330 PROCcli("LOAD "+sfile$+" 3000"):PR
OCcli("SAVE "+dfile$+" 3000 8000"):*FX20
0,1
  340 f%=TRUE:X%=40:Y%=100:pt%=0:brush%=
0:plt%=ptplt%:st%=4
  350 !&75=&1440+brush%*&50:CALLcl%
  360 REPEAT
  370 IFINKEY(-102)CALLplt%:PROCmenu:f%=
TRUE:plt%=ptplt%
  380 IFINKEY(-2)S%=st%ELSE S%=1
  390 IFINKEY(-98)ORINKEY(-26)f%=TRUE:X%
=X%-S%
  400 IFINKEY(-67)ORINKEY(-122)f%=TRUE:X
%=X%+S%
  410 IFINKEY(-73)ORINKEY(-58)f%=TRUE:Y%
=Y%-S%
  420 IFINKEY(-105)ORINKEY(-42)f%=TRUE:Y
%=Y%+S%
  430 IFX%<0X%=0ELSEIFX%>319X%=319
  440 IFY%<0Y%=0ELSEIFY%>255Y%=255
  450 IFf%ANDplt%=eorplt% CALLplt%
  460 ?&72=X%DIV4:?&73=Y%:!&75=&1300+&50
*(X%MOD4)
  470 ?&7F=?&72 MOD4:!&7B=&1100+pt%*&40+
(?&73 MOD16)*4:?&84=16-(?&73 MOD16):!&85
=&1100+pt%*&40
  480 ret%=INKEY(-1):IFret%ANDplt%=eorpl
t%ANDNOTf% CALLplt%
  490 IFret% f%=TRUE:plt%=ptplt%ELSE plt
%=eorplt%
  500 IF f%CALLplt%:IFplt%<>ptplt% f%=FA
LSE
  510 UNTILINKEY(-33)
  520 CALLplt%:PROCcli("SAVE "+dfile$+"
3000 8000"):*FX200,0
  530 ENDPROC
  540 DEFPROCmenu
  550 PROCwindow
  560 REPEAT:*FX15
  570 SOUND1,-7,st%,-1:k%=GET-48:IFk%=17
ORk%=18k%=k%-7
  580 IFk%>=0ANDk%<8 pt%=k% ELSEIFk%>7AN
Dk%<12 brush%=k%-8:ptplt%=&1580
  590 IFk%=91ANDst%<160st%=st%+1 ELSEIFk
%=90ANDst%>1 st%=st%-1
  600 IFk%=34ptplt%=&158F
  610 UNTILk%=29
  620 PROCwindow:!&75=&1440+brush%*&50:C
ALLcl%:*FX15,0
  630 ENDPROC
  640 DEFPROCwindow
  650 ?&72=0:?&73=0:?&75=0:?&76=&11
  660 FORaddr%=&1100TO&12C0STEP&40:?&75=
addr%MOD256:?&76=addr%DIV256:CALLbckplt%
:?&72=?&72+5:NEXT
  670 ?&80=5:FORaddr%=&1440TO&1530STEP&5
0:?&75=addr%MOD256:?&76=addr%DIV256:CALL
bckplt%:?&72=?&72+5:NEXT:?&80=4
  680 GCOL3,3:VDU5:FORA%=0TO11:MOVE16+A%
*80,916:PRINT;~A%;:NEXT:VDU4
  690 ENDPROC
  700 DEFPROCedit
  710 VDU22,1:PROCt:spt%=0:PROCsdsp
  720 REPEAT k%=GET:*FX15
  730 IFk%>135ANDk%<140COLOURC%:COLOUR12
8:VDU31X%Y%+6,255
  740 IFk%=136ANDX%>0X%=X%-1
  750 IFk%=137ANDX%<15X%=X%+1
  760 IFk%=138ANDY%<15Y%=Y%+1
  770 IFk%=139ANDY%>0Y%=Y%-1
  780 IFk%>47ANDk%<52C%=k%-48:GCOL0,C%:P
LOT69,114+X%*4+spt%*80,222-Y%*4:COLOURC%
:COLOUR128:PRINTTAB(X%,Y%+6)CHR$255:?&72
=7+spt%*5:!&75=&1100+spt%*&40+(spt%DIV8)
*(192+16*spt%):?&70=(spt%DIV8)+4:CALLscr
mem%
  790 IF(k%>135ANDk%<140)OR(k%>47ANDk%<5
2) C%=POINT(X%*32+8,820-Y%*32):COLOUR3:C
OLOUR128+C%:VDU31X%Y%+6,254
  800 IFk%=65PROCsfile(FALSE,FALSE)ELSEI
Fk%=66PROCsfile(TRUE,FALSE)ELSEIFk%=67PR
OCsfile(FALSE,TRUE)ELSEIFk%=68PROCsfile(
TRUE,TRUE)ELSEIFk%=69PROCsedit
  810 UNTILk%=70:ENDPROC
  820 DEFPROCsfile(sve%,all%)
  830 VDU28,0,23,39,6;17,128;17,2;12
  840 IFsve%A$="SAVE "ELSEA$="LOAD "
  850 PRINTA$;:IFall%PRINT"all sprites"E
LSEPRINT"sprite"
  860 file$=FNfile("")
  870 IFall%ANDsve% line$="1100 157F":GO
TO920 ELSEIFall% line$="1100":GOTO920
  880 REPEAT:PRINT"Which position (0-B)"
:spt%=GET-48:IFspt%=17ORspt%=18spt%=spt%
-7
  890 UNTILspt%>=0ANDspt%<12
  900 IFspt%<8 line$=STR$~(&1100+spt%*&4
0) ELSE line$=STR$~(&1440+(spt%-8)*&50)
  910 IFsve%ANDspt%<8line$=line$+"+40" E
LSEIFsve% line$=line$+"+50"
  920 PROCcli(A$+file$+" "+line$)
  930 PROCsdsp:ENDPROC
  940 DEFPROCsedit
  950 VDU28,0,23,39,6;17,128;17,2;12
  960 REPEAT:PRINT"Edit which position (
0-B)":spt%=GET-48:IFspt%=17ORspt%=18 spt
%=spt%-7
  970 UNTILspt%>=0ANDspt%<12
  980 PROCsdsp:ENDPROC
  990 DEFPROCsdsp
 1000 VDU28,0,31,39,6;17,128;17,2;12;26
 1010 ?&72=2:?&73=200:?&75=0:?&76=&11
 1020 ?&70=4:FORaddr%=&1100TO&12C0STEP&4
0:?&75=addr%:?&76=addr%DIV256:?&72=?&72+
5:CALLeorplt%:NEXT:?&70=5
 1030 FORaddr%=&1440TO&1530STEP&50:?&75=
addr%MOD256:?&76=addr%DIV256:?&72=?&72+5
:CALLeorplt%:NEXT
 1040 GCOL0,3:VDU5:FORA%=0TO11:MOVE130+A
%*80,100:PRINT;~A%;:NEXT:VDU4
 1050 RESTORE1120:FORA%=1TO6:READA$:PRIN
TTAB(18,A%+7)CHR$(A%+64)") "A$:NEXT
 1060 PRINTTAB(18,16)"Sprites 8 to B"'TA
B(19)"are brushes"
 1070 FORB%=0TO15:FORA%=0TO15
 1080 COLOURPOINT(114+A%*4+spt%*80,222-B
%*4):PRINTTAB(A%,B%+6)CHR$255
 1090 NEXT:NEXT
 1100 C%=POINT(114+spt%*80,222):COLOUR3:
COLOURC%+128:VDU31,0,6,254
 1110 X%=0:Y%=0:VDU23,1,0;0;0;0;
 1120 DATA Load sprite,Save sprite,Load
paint-box,Save paint-box,Edit sprite,Exi
t
 1130 ENDPROC
 1140 DEFPROCt:COLOUR2:A$="Paint Brush"
 1150 A%=10:X%=C:Y%=C DIV256:L%=LENA$
 1160 FORB%=1TOL%:?C=ASCMID$(A$,B%):CALL
&FFF1
 1170 VDU23,128,C?1,C?1,C?2,C?2,C?3,C?3,
C?4,C?4;23,129,C?5,C?5,C?6,C?6,C?7,C?7,C
?8,C?8
 1180 VDU31,B%+17-L%/2,0,128,8,10,129
 1190 NEXT:PRINTTAB(12,3)"edit sprites"
 1200 ENDPROC
 1210 DEFFNfile(A$):REPEAT
 1220 PRINT"Type in the ";A$;" filename
(or *)":INPUTF$:IFLEFT$(F$,1)="*"PROCcli
(F$)
 1230 UNTILLEFT$(F$,1)<>"*":=F$
 1240 DEFPROCcli($&700):LOCALX%,Y%:Y%=7:
CALL&FFF7:ENDPROC
```

✓ Get it right!

```
  10 =    0 0
  20 =    0 0
  30 =    0 0
  40 = 224C C
  50 = 384C 7
  60 = DEBB B
  70 = BFBA 2
  80 = 35A5 2
  90 =  B06 7
 100 = 5796 1
 110 = D699 6
 120 = 522E 4
 130 =    0 1
 140 = D670 5
 150 = 81A7 3
 160 = CCB8 7
 170 = EBF7 8
 180 = 26FA D
 190 = 7E53 5
 200 = 8E3C E
 210 = 2B67 E
 220 = 9E4F 8
 230 = C225 9
 240 = 460A 1
 250 = 580D 0
 260 = 507D 2
 270 =  DF7 E
 280 = B61F 8
 290 = ED0F C
 300 = 5BF8 D
 310 = 4C96 0
 320 = 9E54 0
 330 = C1E2 8
 340 = 6F0B E
 350 = AE6E C
 360 = BFBA A
 370 =  E9A 3
 380 = AF41 7
 390 = 2EB3 7
 400 = A9AB 5
 410 = E46B 2
 420 = A97B 0
 430 = 9573 C
 440 = C212 2
 450 = 9772 B
 460 = BCF3 0
 470 = 62AC 7
 480 = A65D F
 490 = 6D0C 2
 500 =  E68 5
 510 = D472 0
 520 = 3F21 3
 530 = ED0F 4
 540 = 87FA C
 550 = DA41 3
 560 = 5F93 A
 570 = 60FB D
 580 = EA59 6
 590 = 87E1 8
 600 = 8C0E C
 610 = E2AE D
 620 = 1668 1
 630 = ED0F A
 640 = BAC0 6
 650 = 5A22 0
 660 = 28F9 7
 670 = E9A9 4
 680 = E216 5
 690 = ED0F F
 700 = BCBF C
 710 = 574E F
 720 = 4FD5 0
 730 = E7BC 9
 740 = 10BC 1
 750 = 609B E
 760 = 3656 2
 770 = C772 6
 780 =  509 7
 790 = BC85 B
 800 = BE71 1
 810 =  771 1
 820 = 6A5E F
 830 = 7C48 3
 840 = 23F1 C
 850 = F94A 4
 860 = AD0F 7
 870 = C02F C
 880 = 9BD0 C
 890 = A03A C
 900 = 3F2C 6
 910 = 4756 7
 920 = 12D1 0
 930 = 522D 3
 940 = 6F51 7
 950 = 7C48 F
 960 = 9616 6
 970 = A03A 4
 980 = 522D F
 990 = 2CBD 9
1000 =  288 E
1010 =  F47 C
1020 = 88C4 F
1030 = 96B1 E
1040 = 94BE D
1050 = F80B 2
1060 = 951A B
1070 = FA47 B
1080 = CC74 A
1090 = 24BD D
1100 = B1A8 E
1110 = AD20 8
1120 = 74A4 C
1130 = ED0F D
1140 = E4F0 0
1150 = A6C2 1
1160 = 5A73 5
1170 = FCB3 D
1180 = C845 C
1190 = C79F 8
1200 = ED0F 4
1210 = 40B3 D
1220 = 119D C
1230 = 852E 9
1240 = E31F F
```

THE BEEB BODY BUILDING COURSE

A shifty character

Mike Cook registers more facts about his Experimenter's Board

THE Body Build Experimenter's Board was first described in the August 88 issue of *The Micro User* and enables you to learn about interfacing in a relatively painless way. Last month we looked at how to handle inputs: This time we'll take a look at some of the hidden goodies in the VIA – the shift register.

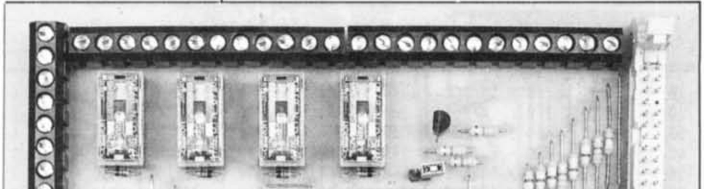
Normally the BBC Micro's VIA is used simply as an input or output port, but there are hidden extras as well. The shift register is perhaps the most neglected part, but it can be most useful.

Basically a shift register is rather like a conveyor belt, the bits – zeros and ones – are loaded on to it at one end and fall off at the other, one at a time, in the same order. The conveyor belt is a register within the VIA – at address &FE0A – and the *end* is control line two on the VIA's B side – CB2.

The shift register can be made to work in the other direction as well so that whatever logic level is near the end of the belt is sucked back on to it. It is called a shift register because each time a bit is moved in or out all the other bits *shift over*. In deepest Lancashire this is known as an *utch up* register. To be technical for a moment, this movement of bit patterns when you are outputting bits one at a time is known as a parallel to serial conversion.

Conversely, when you are collecting or inputting data, it is known as serial to parallel conversion. The only snag is that the shift register can be used for only one type of conversion at any one time: You can't perform a serial to parallel conversion while simultaneously converting parallel to serial.

As well as deciding which way you want the data to flow you also have to select what will control the time when it will be moved. Here you are faced with a choice of three different controlling signals or clocks.



The Experimenter's Board

Time for a byte

You can shift the data when you feed a signal into control line 1 – CB1 – and this happens on the falling edge of the clock signal. In this way you can control the flow of your bit pattern or data from outside the micro.

The two other sources of clock signals are derived from within the micro: You can use the system's clock – 1MHz – to get the fastest possible output, or you can use a counter to move data after a preset number of 1MHz system clock pulses.

Normally, when you shift all the data out of the shift register it is empty and will stop shifting until you load in some more data by storing it in address &FE0A. But there is another option: You can have all the data repeatedly appear on the output – when eight shifts have been performed, the whole operation is automatically repeated. This is known as a recirculating or free running mode.

Those of you who are good at working out combinations will have spotted seven different ways the shift register can work. In fact there are eight different modes – the eighth being disabled or not working. If you look at the table you will see all the different modes.

You can instruct the VIA which mode to use by putting the mode number in the Auxiliary Control register at address &FE6B. To make matters a little more complicated the mode number has to be placed in bits 2, 3 and 4 which means you have to shift the mode number two places to the right – multiply by 4 – before storing it in the register.

Also, other bits in this register affect other aspects of the VIA so we should make sure we only change the bits we want to. This is done with logic operators in the same way as we did when we looked at outputs in the October issue.

Well enough of the theory: Let's carry out an experiment to reinforce the idea of shift registers. So that we can see what is happening we'll use the shift register modes that work on an external input and to provide the input we will use the slotted opto switch. This has built-in hysteresis circuitry so that we will not suffer with contact bounce producing multiple pulses which might be the case if we used a conventional switch or wire shorting loop.

To set up our board we need to move Link 2 to position B. This connects the output of the opto switch to the PB6 screw connector. Now wire a link between PB6 and CB1 and finally move Link 3 to position A so the LED shows the output of the shift register.

We'll start by looking at outputting a bit pattern: To do this we need to set the shift register into mode 7. There is no need to run a program – type in the commands directly from the keyboard:

IN BASIC

```
?&FE6B=7*4
```

IN FORTH

```
HEX FE6B 1C C!
```

Note that in the Basic version I have got the language to work out the bit pattern. This just makes things a little easier to follow – I could have simply used the bit pattern I wanted as I have in the Forth version. Also, there is nothing stopping you from working it out in Forth using a similar calculation.

Now we need to put some bit pattern into the shift register: The number &CC is useful because in binary it is 11001100. This means that our LED will change state every two clock pulses. Load up the shift register by typing:

IN BASIC

```
?&FE6A=&CC
```

IN FORTH

```
FE6A CC C!
```

Now, shift out the bit pattern by moving a piece of paper in and out of the opto slot. You should see the LED changing every two times and after eight clock pulses the shift register will stop and the LED will remain off.

Try putting different numbers in the shift register. Can you predict the sequence? Also see which direction the register travels – which is the first bit out? You might notice a click associated with each change in the LED: This is because the LED drive is also connected to the audio amplifier.

We can monitor the contents of the shift register if we display its contents on the LED bar display. To do this we need a simple loop that continually reads the shift register and transfers it to the LEDs at address &FE61:

IN BASIC

```
10 REPEAT: ?&FE61=?&FE6A: UNTIL FALSE
```

IN FORTH

```
: MON BEGIN FE6A C@ FE61 C! ;  MON
```

Note that in fact the value in the shift register recirculates and does not stop after eight shifts. Try loading the number 1 into it and watch it run round. It recirculates because each time we read the shift register we reset the number of shifts needed to complete the transfer.

Now, let's have a look at using the shift register to gather inputs. First we need to set it in to mode 3 by typing:

IN BASIC

```
?&FE6B=3*4
```

IN FORTH

```
HEX FE6B C C!
```

Then, so that we can see what is going into the register, we need the same program we just had to continuously monitor the contents of the shift register. Then take a wire and connect one end to CB2 to make the data input: Touch it on the E connector for a logic zero or leave it unconnected and it will float high giving a logic one.

You should note that the LED will indicate the logic state you are about to put into the shift register. Now trip the opto switch and watch the shift register fill up. Try to input a specific bit pattern such as alternating zeros and ones.

While we have a program running it only gives us a window on the shift register: The accumulation or outputting of the bit pattern happens without any intervention from the micro. This is important because we need not take up micro time performing a serial to parallel conversion – it can be left free to do other tasks.

There are many practical applications of shift registers such as serial communications between micros, data gathering and generating special pulse trains. Next month we will see how the shift register ties in with the other hidden part of the VIA – the timers.

In the meantime, here's a little test: Write a program to simulate the shift register in the input mode. Use PB0 as the data input and PB1 as the clock, displaying the register on the bar display. I'll give answers in Forth and Basic next month. See you then, and have a merry Christmas.

Mode	Direction	Clock
0	Disabled	
1	Into register	Timer T2
2	Into register	1MHz clock
3	Into register	External on CB1
4	Out of register	Timer T2 recirculating
5	Out of register	Timer T2
6	Out of register	1MHz clock
7	Out of register	External on CB1

Shift register modes

> This time we'll take a look at some of the hidden goodies in the VIA

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The Body Build Experimenter's board in kit form – £60 – or ready assembled – £70 – is available from Musbury Consultants, 8 Fairhill, Helmshore, Rossendale, Lancs BB4 4JX. More details of individual component prices are in the September and November issues of *The Micro User*.

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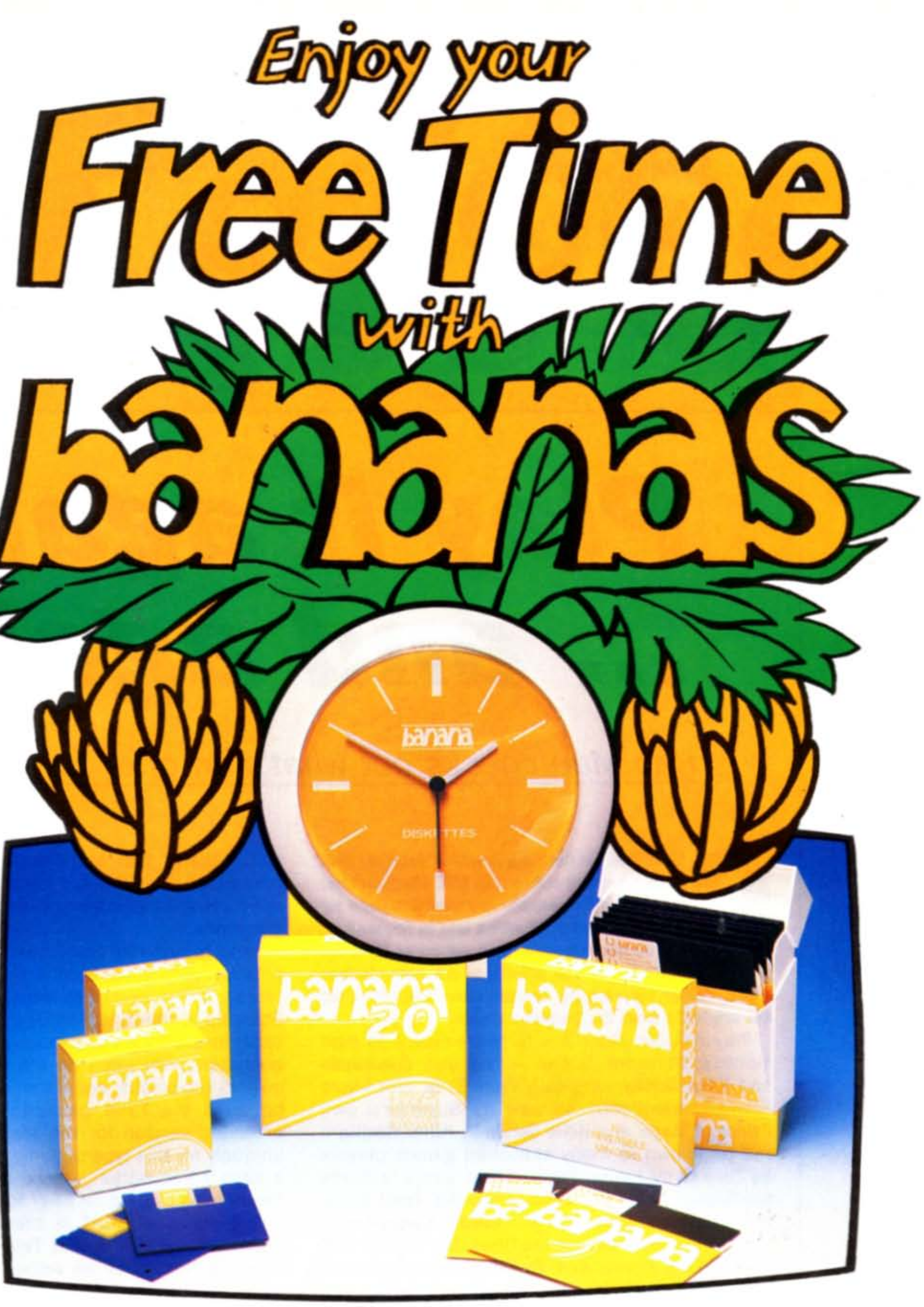

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Play it again ... and again

Hac Man checks out what's on offer for yuletide

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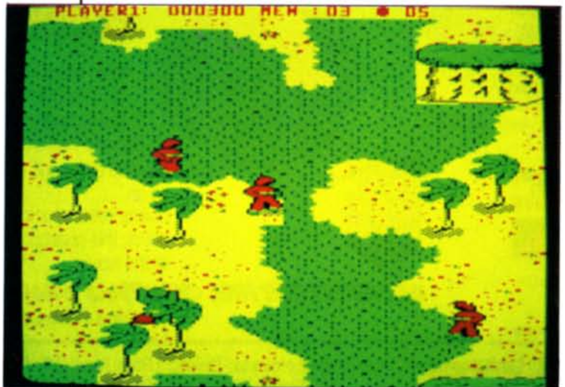
- Way of the Exploding Fist
- By Fair Means or Foul
- Play it again Sam 3
- Play it again Sam 4
- Play it again Sam 5
- A Question of Sport
- Summer Olympiad
- MayDay Squad
- Repton Infinity
- Circus Games
- Superman
- Exile

CHRISTMAS is here again with a flood of great games coming out for the BBC Micro in time for the festive season. Superior has gone for a blitz approach. Starting late in September, its release schedule does not let up until the year is out. Many of the offerings are compilations which, rather surprisingly, feature some titles that did not originate from the Superior stable.

Play It Again Sam 3 – to be reviewed in next month's Software Scene – features **Commando** and **Killer Gorilla**, originally from Elite and Micro Power respectively, as well as Superior's own **Palace of Magic** and **Killer Gorilla II**. Killer Gorilla II will be known to many seasoned games players as Zany Kong Junior. Play It Again Sam 4 features **Spellbinder**, **Grand Prix Construction Set**, **Frak!** and a previously unreleased title – **Cosmic Camouflage**.

The next two releases are titles that I first heard about many moons ago, **By Fair Means or Foul** and **Exile**. The former is a boxing game in which you can perform a number of fair moves such as a body blow, upper cut or duck punch, and also four foul moves – groin punch, head butt, knee and kick. Master 128 and Compact owners will be pleased to know that the package also contains a specially extended version of the game for their machines.



Fighting it out in Commando

Exile is another game that falls into the ever popular arcade-adventure category. Written by Jeremy Smith, author of Thrust, and Peter Irvin, of Starship Command fame, it certainly has an excellent pedigree and features some of the best animation ever seen on the BBC Micro. Master owners especially, should sit up and take notice, because the Exile package also features an extended version for the Master series. Almost uniquely for this type of game, Exile also features a save game option – take that as a clue that Exile isn't going to be easy to complete.

A Question of Sport is the officially licensed micro version of the BBC Television programme. News of this came as rather a surprise to me, because Superior is not normally noted as champion of the licensing concept, but I'm sure it will sell well in the Christmas market.

No Christmas would be complete without a Repton game. **Repton Infinity** is the name of this latest offering, so called because it almost everything can be redefined – including the actions of the creatures and objects – allowing almost infinite scope for designing screens and puzzles that are even nastier than is currently possible. No doubt we will see some examples in due course.

Playing some more

On Play It Again Sam 5, the lone Superior title is outnumbered by games that really stand out: Micro Power's **Imogen** and **Fortress**, the Zaxxon-clone written by Mat Newman. Superior's **Elixir** and Alligata's **Bugblaster** play the supporting cast.

Tynesoft has gone for the old maxim of quality rather than quantity. **Superman**, the company's big title of the year that I first mentioned in the September issue, should be out early in December. At the time of writing, I have still not seen the game, but by all accounts it will be worth waiting for.

Also from Tynesoft is **Summer Olympiad**, a collection of sports events released to coincide with the Olympic Games last September. As with Superman, I did not get to see the game before this column went to press, but I expect that it will still be selling well.

Games galore

Two titles that we can expect from the Tynesoft stable in the first quarter of next year are **Circus Games** – very much what the title implies – and **MayDay Squad** – an icon-driven 3D maze game in which you are one of the three members of the MayDay Squad that has been called in to rescue hostages from an embassy siege.

Go-Dax is a relatively new name to the BBC Micro market and is famous for its excellent game Skirmish. Although its founder, Darryl "Dax" Still has since left the company, Go-Dax is still very much alive. One title that will be of interest to Archimedes owners is **Fireball**, an Arkanoid/Impact-style game which should provide some less strenuous relief for anyone struggling to get to grips with Zarch and Conqueror.

Finally, just out from Impact is its first own-label Archimedes release **Quazer** which we first saw at *The Micro User* office in its pre-release form many months ago. It's a fairly standard vertical scrolling shoot-em-up with very clean graphics and catchy music.

Getting on top

Last month I mentioned that I was not a great believer in high score tables. However, since starting this column I've received a number of letters from readers who have asked if their top score for a particular game is the highest in the land. Regular readers may recall that I included high scores for Zarch and Uridium in last month's column. So – in for a penny, in for a pound – here is a selection of high scores for many of the most popular games for the BBC Micro.

However, in the Hac-Man tradition, it is a high score table with a difference: Each has been achieved by the author of the game. Any additions or amendments are welcome – from authors as well as players – but please submit only genuine scores achieved without using any cheat modes or other modifications.

I have excluded arcade-adventures, such as the Repton and Thunderstruck series, because each one has an ending and therefore a maximum score, so that potentially everyone who completes a game of this type can achieve that maximum score. I have also excluded Elite and other games in which it is possible to save your position. Once the player has become proficient at these games, high scores are achieved more by persistence than by outright skill.

Game	Score	Author
Arcadians	28,500	Orlando
Barbarian	55000	Dylan
By Fair Means or Foul	230,000	Michael Simpson
Crazee Rider	48,500	Kevin Edwards
Dune Rider	5,000	Ashley Saulsbury
FireTrack	1,400,000	Orlando
Fortress	160,000	Mat Newman
Galaforce	45,000	Kevin Edwards
Galaforce II	177,250	Kevin Edwards
Killer Gorilla	80,000	Adrian Stephens
Killer Gorilla 2	48,000	Christopher Hyde
Mr EE	300,000	Adrian Stephens
Positron	200,000	Gary Partis
Ransack	150,000	Peter Scott
Skirmish	120,000	Delos D. Harriman
Space Hi-way	100,000	Mat Newman
Thrust	1,000,000+	Jeremy Smith
Ultron	50,000	Gary Partis
Uridium	100,475	Angus Hughes
Zalaga	150,000	Orlando

Kevin Edwards tells me that when he achieved his Galaforce II high score he actually started on level 16 – talk about masochism.

Chop suey

Whenever I review karate games I'm left with the thought: "Well, it's pretty good, but not quite as good as Fist". Many such games have been released on to the BBC Micro games market in recent years, but for my money **Way of the Exploding Fist** is still the best of the bunch. Although many of its competitors such as Yie-Ar Kung Fu I and II, offer more variety or more complex gameplay, in my mind none of them quite matches the technical excellence of Exploding Fist.

When I bought a Master 128 to replace my trusty Model B I discovered that Fist – in every one of its different incarnations – was one of the many games that suddenly refused to work with my new toy. There are three different versions of the game – the original cassette, one for disc and the mark 2 cassette version – also re-released on the Mastertronic Ricochet budget label. No prizes for identifying the disc version, but the two cassette ones are slightly more tricky to tell apart.

If the game loads a Mode 1 title page of the front cover of the game packaging using a Spectrum-style loader – building up the picture in white, line-by-line then filling in the colour afterwards – you have the first issue of the game. This version also features only one backdrop – a

Turn to Page 72 ▶

Help Corner

Stephen Keeler is having difficulty in obtaining wargames. He is specifically after Waterloo and Redcoats, both published by M.C. Lothlorien, one of this country's longest established software houses.

I am glad to say that M.C. Lothlorien is still going strong and that both titles are still in production. The company can be contacted on 061-773 1068.

◀ *From Page 71*

courtyard with a giant Buddha statue behind the contestants. The second issue features two backdrops – a training room scene with training mats on the floor, as well as the courtyard scene – and switches between the two after every two rounds.

When I discovered that Fist was not directly compatible with the Master, I started digging and discovered that all three versions featured direct calls to routines resident at particular addresses in the Model B's OS1.2 rom. Regular readers may recall that this was the reason why Jet-Pac would only work on the Model B. Naturally, any MOS-specific call would not work on a different MOS, but it wasn't too much work to redirect the calls to the equivalent addresses in the Master's operating system.

Fist full of games

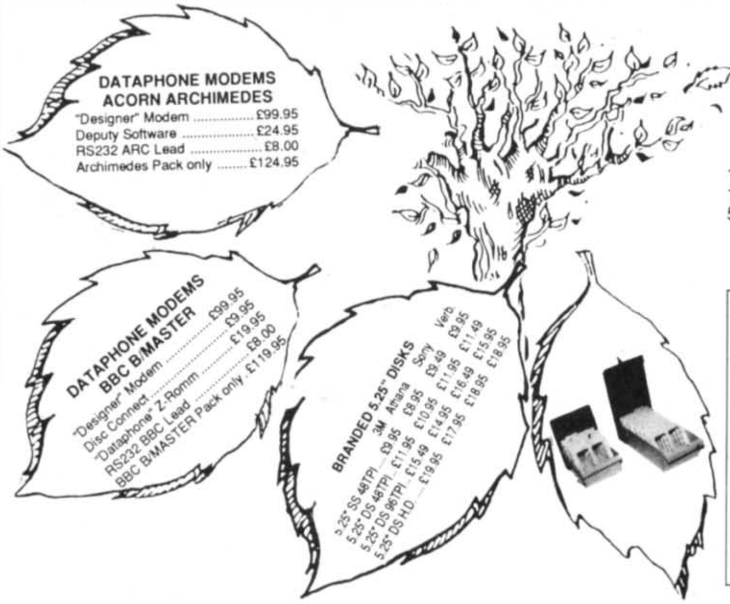
That dealt with the game's compatibility problems for me and I forgot about them. Only when a reader by the name of Kenny from Smethwick, West Midlands wrote to me to make this very point was I reminded that other B+ and Master owners have always been deprived of this excellent game. So, here, is a conversion routine suitable for the disc version of the game. As usual, enter the listing as shown, save it on one of your own blank discs, type:

```
RUN
```

and follow the on-screen instructions.

Incidentally, Michael Simpson, the author of Way of the Exploding Fist, also wrote Superior's new boxing game **By Fair Means or Foul**, to be reviewed very soon.

```
   10 REM Way of the Exploding Fist
   20 REM Master conversion (disc v
ersion)
   30 REM by Hac-Man 1988
   40 REM (C) The Micro User
   50 REM
   60 FOR I%=0 TO 2 STEP 2:P%=&70:[
OPT I%
   70 JSR &1E80 : LDA &FFB7 : STA &
8E : LDA &FFB8 : STA &8F
   80 LDY# 6 : LDA (&8E),Y : STA &6
C1 : INY : LDA (&8E),Y : STA &6C2
   90 JMP &1ED7
  100 ] :NEXT
  110 PRINT "Please insert Fist dis
c and press any key...";:*FX 15,0
  120 A%=GET:*DISC
  130 *KEY0 *DIR "|MLOAD"EDITAR"|M1
20?&1ED4=&4C:CALL &70|MRUN|M
  140 *FX 138,0,128
```



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FRUITS!

FRUIT machine games will never be the same again once you've seen Fruits. With graphics that would put many an arcade version to shame, this type-in listing will let you gamble your time away but still leave the contents of your wallet intact. Using impressive user-defined characters, Fruits turns your BBC Micro into a one-armed bandit complete with sound effects, nudge and hold features, smooth scrolling windows and a separate score panel.

Type in the listing and make sure you have made no typing errors using Get it Right! Save and run it, and you have all the features of a real fruit machine at your fingertips.

You start with £2.50 in the cash section at the top left of the screen and each spin costs you 10p. Any winnings are shown in the stake section were they can all be gambled or – by pressing B for each 10p you want to keep – you can put some into the bank so you only risk part of your bounty. Pressing C adds both your bank and stake to your cash.

The winning combinations are shown at the start of the game and below.

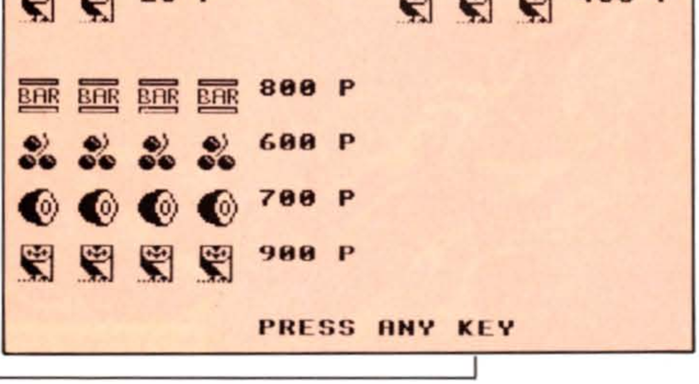
Happy gambling!

```
   10 REM FRUITS!
   20 REM by Jason Price
   30 REM (c) The Micro User
   40 MODE 4
   50 VDU 23;8202;0;0;0;
   60 PROCindata
   70 PROCudgs
   80 PROCreels
   90 PROCINTRO
  100 PROCscreen
  110 REPEAT
  120 PROCstart
  130 UNTIL FALSE
  140 END
  150 DEFPROCudgs
  160 VDU 23,236,255,128,255,0,225,146,1
46,227
  170 VDU 23,237,255,1,255,0,206,41,41,2
38
  180 VDU 23,238,146,138,242,0,255,128,2
55,0
  190 VDU 23,239,42,41,41,0,255,1,255,0
  200 VDU 23,240,0,14,27,61,62,63,31,14
  210 VDU 23,241,32,32,16,144,144,160,32
,64
  220 VDU 23,242,0,57,108,246,250,254,12
4,56
  230 VDU 23,243,128,56,108,246,250,254,
124,56
  240 VDU 23,244,1,7,31,63,127,127,254,2
54
  250 VDU 23,245,240,200,132,4,2,50,73,7
3
  260 VDU 23,246,254,254,127,127,63,31,7
,1
  270 VDU 23,247,73,73,50,2,132,132,200,
240
```

Turn to Page 121 ▶

This superb simulation by Jason Price gives all the features of a real fruit machine

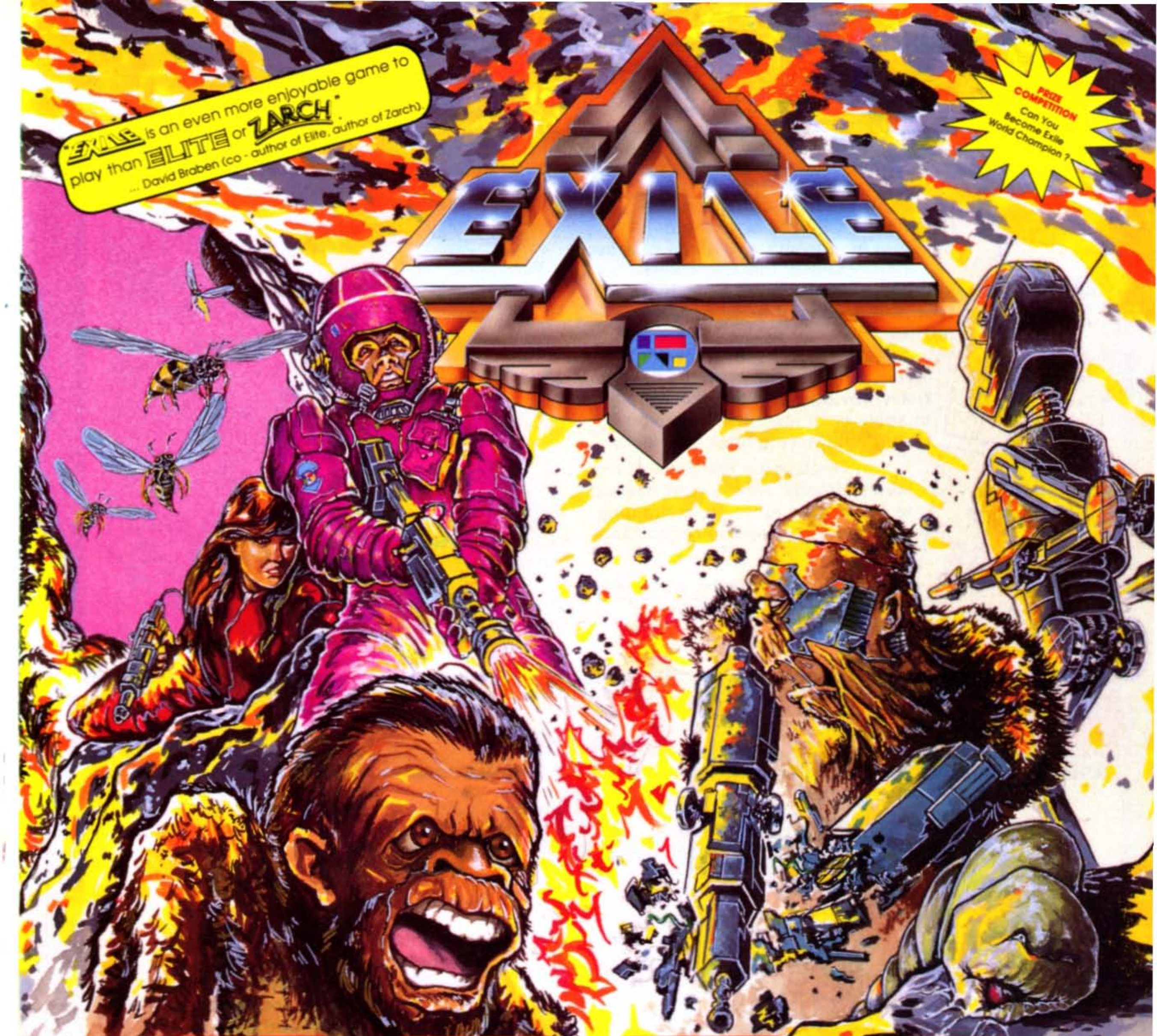
The winning combinations



```
                FRUITS! - WINS

BAR BAR 20 P                BAR BAR BAR 300 P

        20 P                            100 P

        20 P                            200 P

        20 P                            400 P


BAR BAR BAR BAR 800 P

                600 P

                700 P

                900 P

                PRESS ANY KEY
```

Yellow Killer Bird
Wasp Nest
Robots Approaching a Transporter
Abandoned Urn
Complex Catacomb
Underground Fire

This map shows just a small part of the World of Exile.


"EXILE is an even more enjoyable game to play than ELITE or ZARCH".
... David Braben (co - author of Elite, author of Zarch).
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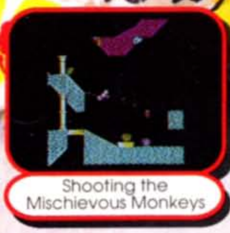
Attacked by a Robot


Shooting the Mischievous Monkeys

Searching for Abandoned Weapons

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- An Instruction Manual.

The game was designed and written by Peter Irvin and Jeremy Smith.

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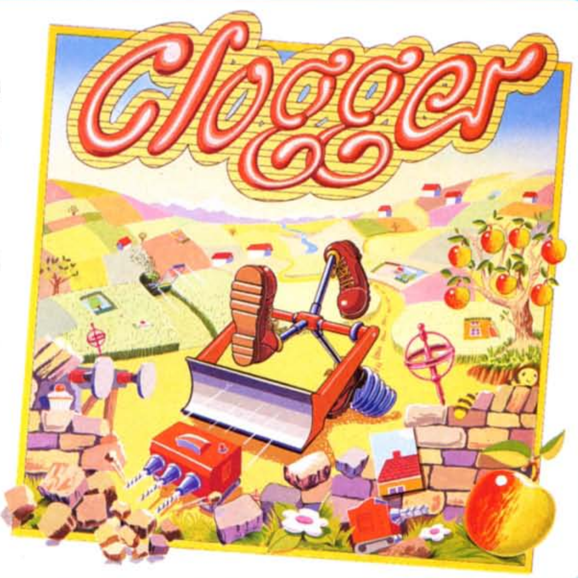

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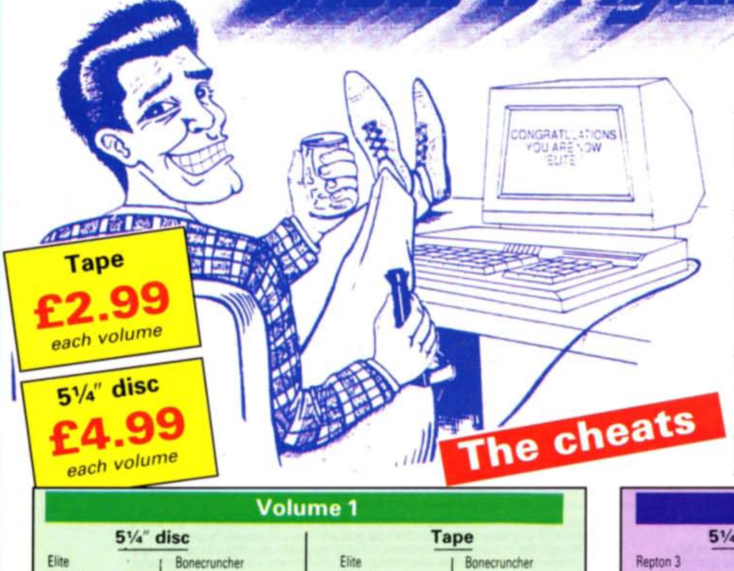

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- Arcadians
- Kourtyard
- Despatch Rider
- Phantom

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- Arcadians
- Kourtyard
- Despatch Rider
- Phantom

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- Life of Repton
- Galaforce
- Codename: Droid
- Crazee Rider
- Paperboy
- Saigon
- Spycat
- Spellbinder
- Palace of Magic
- Icarus
- Impact
- Magic Mushrooms
- Planetoid
- Ransack
- Imogen
- Uridium
- Karate Combat
- Repton 3 passwords

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- Icarus
- Impact
- Magic Mushrooms
- Planetoid
- Ransack
- Imogen
- Uridium
- Karate Combat
- Repton 3 passwords

Place your order today, using the form on Page 135

Just the ticket!

Peter Harris shows how to get a new style of output from your micro

HAVE you ever wanted to produce tickets for a local event using your BBC Micro? Creating simple text ones is no problem, but here's a utility that lets you print well designed tickets which can be numbered if you so desire. All you need is a Mode 0 screen designer and an Epson-compatible printer.

Screen dumps are at first glance a simple way of doing this, and it's certainly cheaper than organising artwork and sending it off to a printer. However, the process is slow if a conventional dump program is used – it could take nearly two hours to print 100 tickets.

One way round this is to open a *SPOOL file before using the dump program and then print the SPOOLed file 100 times instead. This is certainly quicker but involves your disc drive running continuously for over an hour and it's impossible using a cassette.

The answer is to store the output of the screen dump routine in ram before sending it to your printer. Although it is impossible to store two Mode 0 screens in ram simultaneously, we actually don't need to – an area of the screen itself can be used for storage once that part has been processed.

The ticket printing program is not long, so HIMEM can be brought down a long way from its usual position – the start of screen memory. If the beginning of the dump buffer is placed just above the program and variable space there is sufficient memory to store at least a third of the picture before encroaching on the screen memory. The screen picture is corrupted as the buffer fills, but the affected area has already been safely processed.

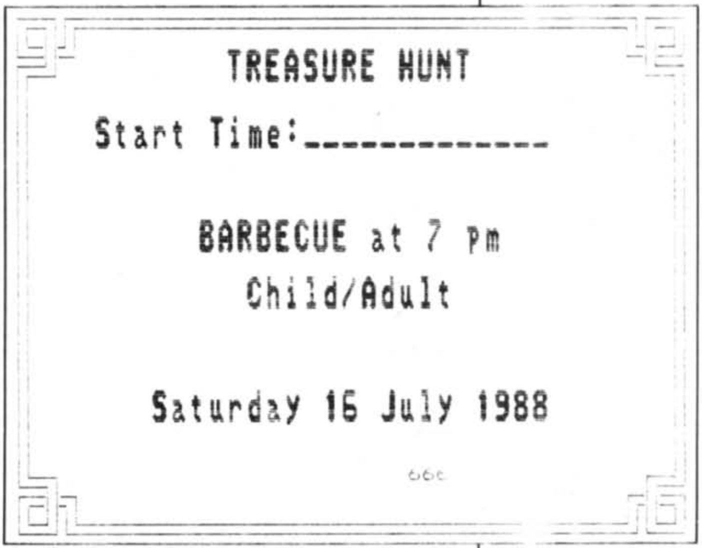
Listing I is a Basic program, DUMPGEN, and you should type it in and use Get it Right! to make sure you have entered it exactly as it is printed. When you run it the screen dump routine will be generated and automatically saved as SDUMP9. The routine rearranges the screen image as if to send to the printer, but sends it to the buffer area instead.

The ticket printer is another Basic program – Listing II. In it lines 150 to 210 strip the icons and borders generated if you're using AMX Pagemaker. They are not otherwise necessary, but as they are very short, should be entered so your listing can be checked with Get it Right! They can then be deleted if you are using another package.

When you run this program you are prompted for the name of a file, which should be a previously saved Mode 0 screen. The next prompts are for the number of copies required and whether you want the tickets numbering. If you request this facility you must enter the start value and the position where the number should be printed on the ticket. It helps to reckon that a hi-res screen is dumped in 32 lines with a width of around 55 pica characters.

The screen is then loaded and displayed, after which nothing seems to happen for a few minutes. In fact the buffer is being loaded and after a few minutes the screen image will start to be corrupted. Printing will start as soon as the whole file has been processed.

Although this utility was written for Mode 0 screens, it will work in any graphics mode. The only alteration you need to make is to adjust the MODE command in line 50 of Listing II. And so that's all there is to producing tickets cheaply using your BBC Micro.



TREASURE HUNT

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BARBECUE at 7 pm

Child/Adult

Saturday 16 July 1988

66c

A sample ticket

Listing 1

```
 10 REM Ticket printer - DUMPGEN
 20 REM By Peter Harris
 30 REM (c) The Micro User
 40 REM >> Produces SDUMP9 <<
 50 osword=&FFF1
 60 osbyte=&FFF4
 70 FOR C%=0TO3STEP3
 80 P%=&70
 90 [
100 .lsb_X BRK
110 .msb_X BRK
120 .lsb_Y BRK
130 .msb_Y BRK
140 .pixel BRK
150 .prb3 BRK
160 .prb2 BRK
170 .prb1 BRK
180 .esc BRK
190 .hor_inc BRK
200 .outbyte BRK
210 .counter BRK
220 .bufadr BRK:BRK
230 ]
240 P%=&B00
250 [
260 OPT C%
270 STX bufadr
280 STY bufadr+1
290 LDY #7
300 .sd0 LDA table,Y
310 STA lsb_Y,Y
320 DEY
```

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◀ *From Page 77*

```
330 BPL sd0
340 LDA #135
350 JSR osbyte
360 TYA \Y holds mode no
370 BEQ sd1
380 DEC prb1
390 LSR prb2
400 LSR prb3
410 ASL hor_inc
420 .sd1 LDA #27   \set
430 JSR prsend
440 LDA #65    \line
450 JSR prsend
460 LDA #8       \spacing
470 JSR prsend
480 .sd2 LDA #0
490 STA lsb_X
500 STA msb_X
510 LDY #3
520 .sd3 LDA prb3,Y
530
540 JSR prsend
550 DEY
560 BPL sd3
570 .sd4 LDA #8
580 STA counter
590 .sd5 LDX #112
600 LDY #0
610 LDA #9
620 JSR osword \read pixel
630 CLC
640 LDA pixel
650 BEQ sd6
660 SEC
670 .sd6 ROL outbyte
680 LDA lsb_Y
690 SEC
700 SBC #4
710 STA lsb_Y
720 BCS sd7
730 DEC msb_Y
740 .sd7 DEC counter
  750 BNE sd5
  760 LDA outbyte \bit pattern to printe
r buffer
  770 JSR prsend
  780 CLC
  790 LDA hor_inc
  800 ADC lsb_X
  810 STA lsb_X
  820 BCC sd8
  830 INC msb_X
  840 .sd8 LDA msb_X
  850 CMP #5
  860 BEQ sd9
  870 LDA #32
  880 CLC
  890 ADC lsb_Y
  900 STA lsb_Y
  910 BCC sd4
  920 INC msb_Y
  930 BCS sd4
  940 .sd9 LDA #10
  950 JSR prsend
  960 LDA msb_Y
  970 BPL sd2
  980 .sd10 LDA #27
  990 JSR prsend
 1000 LDA #50
 1010 .prsend LDX #0
 1020 STA (bufadr,X)
 1030 INC bufadr
 1040 BNE end
 1050 INC bufadr+1
 1060 .end RTS
 1070 .table BRK
 1080 ]
 1090 NEXT
 1100 FOR N%=0 TO 7:READ A%
 1110 table?N%=A%:NEXT
 1120 DATA &FF,&03,&00,&02,&80,&4C,&1B,&
02
 1130 *SAVE SDUMP9 B00 BA9
```

Get it right!

```
  10 =    0 0 | 200 = 309B 7 | 390 = A956 5 | 580 = 7721 3 | 770 = 5C20 1 |  960 = 82A8 2
  20 =    0 0 | 210 = EF31 B | 400 = B977 8 | 590 = AF14 6 | 780 = 74FB 6 |  970 = 3031 4
  30 =    0 0 | 220 = 6E35 8 | 410 = 6918 0 | 600 = 9CF1 3 | 790 = 94C7 4 |  980 = 4FBE F
  40 =    0 0 | 230 = 8B58 4 | 420 = F050 7 | 610 = 93BC 0 | 800 =  608 9 |  990 = 5C20 0
  50 = 4EF9 9 | 240 = E1D6 0 | 430 = 5C20 9 | 620 = B086 5 | 810 = CEC6 5 | 1000 = 7CE4 E
  60 = 7966 F | 250 = EB9E 1 | 440 =  F0D 1 | 630 = 74FB 6 | 820 = 20E6 3 | 1010 = 59AE 1
  70 = 8123 5 | 260 = AF75 A | 450 = 5C20 D | 640 = DC8E 1 | 830 = 14DA 2 | 1020 = 1E61 2
  80 = D02F 2 | 270 = DD61 9 | 460 = B380 E | 650 =  C10 B | 840 = 9B13 D | 1030 = 8A4B 8
  90 = EB9E 6 | 280 = 8CD7 F | 470 = 5C20 F | 660 = 8D00 C | 850 = 525C 4 | 1040 = 2651 7
 100 = 9135 0 | 290 = EC16 A | 480 = 569D 9 | 670 = B958 D | 860 = FDFF 1 | 1050 = F192 6
 110 = 7A16 5 | 300 = D8FC 3 | 490 = CEC6 C | 680 = 28F9 A | 870 = F600 F | 1060 = CFA8 A
 120 = 3B64 F | 310 = 33B6 2 | 500 = 6497 0 | 690 = 8D00 6 | 880 = 74FB 4 | 1070 = 95DE 7
 130 = D047 A | 320 = F888 8 | 510 = AC92 B | 700 = BD7B D | 890 = 1629 5 | 1080 = 8B58 1
 140 = 3340 9 | 330 = 1073 B | 520 = 2038 A | 710 = DEE7 0 | 900 = DEE7 E | 1090 = 2C83 9
 150 = 6390 7 | 340 = B47E A | 530 =    0 A*| 720 = D553 B | 910 = E16A C | 1100 = 5334 6
 160 = C9C1 3 | 350 = 8E7E A | 540 = 5C20 C | 730 = 8C67 A | 920 =  4FB 5 | 1110 = 218C 1
 170 = 2713 7 | 360 = 650A 1 | 550 = F888 0 | 740 = 6F2C 0 | 930 = E530 3 | 1120 = EB97 1
 180 = 8647 3 | 370 = 7CF7 8 | 560 = 2010 F | 750 = 728D C | 940 = A6EA 1 | 1130 = E95C C
 190 = 3539 B | 380 = 4E95 3 | 570 = 575E 2 | 760 = B6A4 8 | 950 = 5C20 4 |
```

Listing II

```
   10 REM Ticket printer - DUMPGEN
   20 REM By Peter Harris
   30 REM (c) The Micro User
   40 REM >> Requires SDUMP9 <<
   50 MODE0
   60 ONERROR  VDU3:REPORT:PRINT" at ";E
RL:END
   70 HIMEM=PAGE+1280:tktnum=-1
   80 INPUT TAB(10,15)"Name of picture f
ile? "f$
   90 INPUT TAB(12,18)"Number of copies?
 "N%
  100 PRINT'"Ticket numbering required?
 (Y/N) ";
  110 REPEAT A$=GET$:UNTIL INSTR("YyNn",
A$):PRINTA$
  120 IFINSTR("Yy",A$) INPUT'"Start num
ber? "tktnum"on picture line "numlin"a
t tab position "numtab:tab$=STRING$(numt
ab," ")
  130 DIM buff LENf$+6:$buff="LOAD "+f$
  140 X%=buff MOD256:Y%=buff DIV256:CALL
&FFF7
  150 MOVE1,1
  160 PLOT103,45,935
  170 MOVE1,935
  180 PLOT103,1279,1020
  190 PLOT103,1203,25
  200 MOVE 1279,25
  210 PLOT103,1,1
  220 *LOAD SDUMP9
  230 T%=HIMEM+1:X%=T%MOD256:Y%=T%DIV256
:CALL&B00
  240 U%=?&7C+?&7D*256-1
  250 VDU2:FOR M%=1 TO N%:line=0
  260 FOR A%=T% TO U%:C%=?A%:IFC%=27 PRO
Cline
  270 VDU1,C%:NEXT
  280 IF M%/3=M% DIV3 VDU1,12
  290 NEXT:VDU3:END
  300 DEFPROCline
  310 IF tktnum=-1 ENDPROC
  320 IF A%?1=?&77 AND A%?2=?&76 line=li
ne+1
  330 IFline<>numlin ENDPROC
  340 num$=tab$+STR$tktnum:FOR L%=1 TO L
ENnum$
  350 VDU1,ASC(MID$(num$,L%,1)):NEXT
  360 FOR L%=1 TO LENnum$:VDU1,8:NEXT
  370 tktnum=tktnum+1:VDU2:ENDPROC
```

Get it right!

```
  10 =    0 0 | 140 = 9AD1 2 | 270 = 2512 4
  20 =    0 0 | 150 = 5CB4 7 | 280 = 6C90 F
  30 =    0 0 | 160 = A53C 8 | 290 = 54BA F
  40 =    0 0 | 170 = 331C 1 | 300 = 961E D
  50 = FA1B B | 180 = E147 2 | 310 = CED6 1
  60 =  478 7 | 190 = 1F40 7 | 320 = 15A8 F
  70 =  6FB 3 | 200 = 8ECD 6 | 330 = A705 0
  80 = 6D80 5 | 210 = 8EC1 7 | 340 = 2A81 7
  90 = 3045 B | 220 = DAB9 7 | 350 = 200A E
 100 = 73FE D | 230 = 8E95 1 | 360 = 26BB 2
 110 = D71E A | 240 = A8A4 0 | 370 = C509 0
 120 = 8AF3 E | 250 = C123 9 |
 130 = 86EC 8 | 260 = DC35 6 |
```

The day Daniel's dad brought his office printer home.

My dad's firm is always busy so he has lots of LC-10 printers at his office.

In fact, he sometimes has so much work to do that he keeps a personal computer in his study so he can bring work home.

But when he's really busy, he brings home one of those Star printers too.

Of course, I know exactly how to use them because we have the colour version at school.

It can print documents in six different colours.

So I'm not surprised WHAT MICRO? called the LC-10 the 'Best Budget Dot Matrix Printer' on the market.

What's more it's a lot less expensive than other printers but much better quality.

(My friend, Philip, even has one for his Commodore.)

For a start the front control panel is child's play.

The six different fonts give you so many different style options when you print things.

It's pretty fast too with a draft elite speed of 144 cps and high density near letter quality at 36 cps.

There's also the LC-10's special feature called 'push-tractor' which gives the lowest tear-off position of the paper.

And you can park continuous paper and automatically load single sheets – and I think that's unique for this sort of printer.

You know, if I keep my paper round going for a few more weeks I'll soon have enough to buy my own LC-10.

And then for a small fee, dad can borrow mine.

THE star COMPUTER PRINTERS

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Craven House, 40 Uxbridge Road,
Ealing, London W5 2BS.
Telephone: 01-840 1800.

A division of
Star Micronics Co., Ltd., Japan.

Please send me details of the Star LC-10 business printers.

Name ________________

Company ________________

Address ________________

Postcode ________ Telephone ________

Or just call Belinda on 01-840 1829. L10MU12

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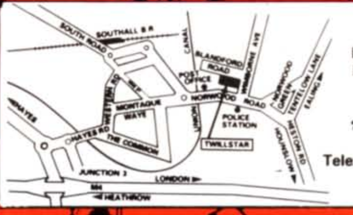

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Archmedes software in stock

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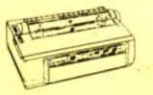
Panasonic KX-P1081.	**135.00**

The faster and enhanced KX-P1081. 120 cps in draft mode. 24 cps in NLQ mode. Fully Epson RX80 and IBM Matrix and Graphics Printers compatible. Standard friction and tractor feed. Operator accessible print mode switch. Standard 8 bit parallel interface. RS232 interface is optional.

NEC P2200 PINWRITER

275.00 + VAT



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24-pin dot–matrix printer. Letter-perfect print, in several sizes, at 56 characters per seconds (cps). Or switches to draft mode for high-volume outputs at 168 cps. Built-in tractor that permits push or pull feeding.

Print Rate: High-speed draft: 168 cps. Standard draft: 140cps. Letter quality: 56 cps
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CUT SHEET FEEDER	**59.00**
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NEC MONITORS

OFFICIAL NEC UK PRODUCTS

MULTISYNC PLUS	**695.00**

This 15 inch, high resolution (1024 x 768) monitor is ideal for use with IBM/XT/AT and PS/2 plus Apple Mac II and othe IBM PC compatible microcomputers. It automatically scans all horizontal frequencies from 21.8 KHz to 48 KHz and vertical frequencies ranging from 50 to 90 HZ. It supports EGA, enhanced EGA, PGC, MCGA, and VGA colour graphics standards.

MULTISYNC II	**450.00**

This redesigned 14" MultiSync high resolution monitor offers all the benefits of the previous model such as automatic synchronisation, suitable for use with IBM/XT/AT and PS2 plus Apple Mac II and compatible with Hercules, MDA, CGA, EGA, EGA+, PGC, and VGA graphics standards plus front mounted user controls and automatic selection of Analog/TTL and Vertical Hold modes.

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Offers the user a high resolution (720 x 480), 14 inch monochrome display which is hardware compatible with IBM PC, XT, AT, and PS/2 machines. The MultiSync GS supports MDA, Hercules, CGA, EGA, MCGA and VGA display standards. It automatically locks on to one of five frequencies from 15.7 to 31.5 KHz to suppport all the above major graphics standards and three vertical frequencies ranging from 50 to 70 HZ.

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PRINTERS

AMSTRAD LQ3500	**250.00**

24 pin NLQ 160cps. LQ 54CPS. Prints graphics output. Supplied with bolt-on tractor and featuring PC and Epson LQ-1500 compatibility.
(Subject to availability)

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200cps wide-carriage. Inbuilt tractors allow fast paper slew rates, and PC and Epson FX compatibility.
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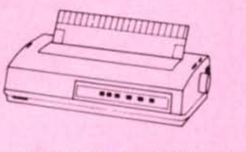

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CITIZEN LSP 100P	**138.00**
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80 column. 24 pin. Dual interface.	
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CITIZEN HQ P45	**310.00**

CITIZEN 120D

CITIZEN HQ P40

PRINTERS

CEEFAX Guide

B B+ M

Software is currently transmitted for a period of one week. Files are available from Friday afternoons to the following Thursday evening, with the exception of the Issues teachers' notes which, due to their topical nature, are available from the Wednesday morning to the following Tuesday evening during the week of transmission. The details are provisional only.

October 28 to November 3

T/SWR17 **NoBasic**

The rom images created in earlier modules of the sideways ram programming course have all been service roms. Language roms are introduced in module 17 with the example language NoBasic.

E/Info **EcSec4**
EcSec1 **EcSec5**
EcSec2 **Link**
EcSec3

This is a system based around the concept of several membanks. It can be used to store notes, messages, program sections, complete machine code routines, Macro commands or any other data. It can act as an extended function key and the contents are retained over a hard break, and can be accessed from any programming language. Eclipse also provides a host of other features.

Pen

A utility allowing the easy creation of graphics characters and fonts by using a light pen. Touch a pixel once to illuminate it, touch it again to toggle it off. Parameters for the VDU 23 command can then be listed and stored for future use.

T/SPK04 **Search**

This fifth module in the series explaining how to get the most from your speech system looks at the techniques of searching for available words in the Phrom, even when more than one rom is attached.

Count

A superb educational game for younger children, from the May edition of *The Micro User*. Counting with Charlie is a graphic-based game for teaching youngsters to count. The user is asked to count fruit displayed on the screen. Correct answers receive a satisfying tick and bleep. Wrong answers a lower pitched tone with a cross

November 4 to 10

T/SWR18 **RFSgen**
RFShead **Demo**

The series for programmers using sideways ram continues with the rom filing system – RFS – on all BBC Micro's. Any files can be stored on rom and made permanently and instantly available. This module looks at how files must be formatted with a structure similar to the tape system and offers a simple RFS interpreter and formatting program.

T/SPK05 **Create**
Address **Mouth**

The sixth module on the Acorn speech chip looks at ways to increase the vocabulary of your system using phonemes.

Banners **BanDoc**

Produce any size of text on your Epson-compatible printer with this utility. Banners will allow you to create posters and textual displays with huge characters printed out using a normal printer.

Dumps **Proc**

A small procedure written in Basic which gives a screen dump at the touch of a button at almost any time.

Drums

Play this great up-tempo version of the classic Simon game from the October 1987 version of *The Micro User*.

November 11 to 17

T/SWR19 **RFSgen**
BootRFS **Demo**

This module continues the study of the RFS – rom filing system – as it applies to sideways ram on the B+128 and Master series.

T/SPK06 **Chopup**
Address **Telsoft**

This, the final module on the Acorn speech processor, takes a look at the creation of new words with the SPEAK and RESET commands – example programs are supplied.

Telecat

An alternative automatic file downloading system with minimal interaction between you and the micro to instigate the downloading of all the files you want from the telesoftware broadcasts. This is an updated version of an earlier broadcast.

Quest

Collect the diamonds in this fantastic race against time in the crystal caves. From the July 1987 issue of *The Micro User*.

November 18 to 24

T/SWR20 **RFServ**
RFSgen **Demo**

The sideways ram programmers course continues its study of the rom filing system. On a Master several roms containing your own software can be plugged into a cartridge for use in the rom cartridge slots.

Sharinf **Analyse**
Main **Plot**
Entry

A Ceefax-interactive suite of programs to keep track of your own personal portfolio of shares. Since the routines use the actual share data from the Ceefax transmissions, the program will show your share status accurate to within a few hours.

ATScal **Dumps**

There is now no need to buy calendars year after year – this handy routine will print them out for you. After automatically finding the current date from Ceefax, an option of this year's, next year's or last year's calendar may be printed out in three different styles and several sizes.

T/MOU00 **Testmou**

The first in a new series of seven modules giving step by step tuition on writing your own mouse control software rather than depending on the manufacturer's control rom. This can save money, since no commercial software is required, and lead to a greater, more diverse use of your mouse.

Daybas

What day were you born? Now you can find out with this excellent short utility from the November 1987 issue of *The Micro User*.

Nov 25 to Dec 1

T/SWR21 **RFSlang**
RFSgen **Demo**

More details about the BBC Micro's rom filing system. In this module, discover how to create a service rom image using a language rom design.

Auto **Year**
Acc0 **Print16**
Acc1 **Overall**
Acc2

Raise your Yuppy street cred with this second half of the Ceefax interactive suite, allowing you to follow the fortune of your personal portfolio of shares as they toss and turn upon the waves of high finance.

Texrom

A superb utility to sit quietly in your micro waiting to be called. Texrom is a screen dumper with a difference – many parameters may be specified. For example, text only, graphics, graphics with tone colouring, variable size and a super three option where the last three selected screens are printed side by side in the width of an A4 sheet.

T/MOU01 **Mouse**

Another module in our series designed to maximise the use of your mouse. In the second unit we discover how to generate the coordinates for tracking the mouse and how to alter these to suit your own requirments.

Brk/Src

See your own personalised message when you press Break with this useful little program from the April 1988 issue of *The Micro User*.

Archimedes SOFTWARE

Try taking a snapshot

Gareth Long makes a grab for Archimedes graphics screens

IN the June issue of *The Micro User* there was an interrupt-driven utility to save screens in any mode complete with colour information while another program is running. This month we present a simple Archimedes module that does the same job. The screen grabber is an ARM code program written for either the 300 or 400 micros enabling you to save entire screens at any point with a single key press.

It is loaded as a software module before running the program that you want to take snapshots of and uses interrupts to test for Control+C being pressed. Then it issues:

```
*SCREENSAVE Screen00
```

to the command line interpreter. Each time you use it the two digit number at the end of the filename is incremented. Because it is used under interrupt and takes quite a while to execute you will occasionally get some corruption, but it's not serious.

If you use a fast screen save routine either change the command in the program – after ensuring it is correct with the checksum – or use the Alias:

```
*SET Alias$Screensave FastSave %0
```

so that every time the instruction is sent it is converted to the new one.

Type in the listing carefully, ensure it is correct, and save it. When run it generates the module which is saved automatically as Screengrab. You can load this with:

```
*RMLoad ScreenGrab
```

or:

```
*ScreenGrab
```

or even just double click it from the Desktop. Check that it has loaded properly by typing *MODULES. Details of how a software module is put together were given in the August issue and the screen grabber will respond to:

```
*HELP scr.
```

correctly. If you want to disable it use the *RMKill command.

The possibilities of this module are endless. You could, for instance, save a screen from Zarch for dumping to a printer so you can show your amazing hi-score. Or quickly grab a picture you are designing with Artisan. It's handy for saving the instructions page of a utility, or any screen you want to capture. The only limit is your imagination.

MAIN VARIABLES

Interrupt	Interrupt routine
active	Screen being saved flag
finalise	Module closedown routine
initialse	Module start-up routine
r0-r2	Work registers
r12	Workspace register
sp	Stack register
link	Return address link register
pc	Program counter
code%	Assembly buffer
Version$	Module version data

```
   10 REM > $.GRAB
   20 REM The Screen Grabber system V1.3
   30 REM by Gareth S. Long
   40 REM (c) The Micro User
   50 PROCinit:PROCassm:PROCsave:END
   60 DEF PROCinit:DIM code% &400
   70 Version$="1.30 ("+MID$(TIME$,5,11)+")"
   80 sp=13:link=14:pc=15
   90 ENDPROC
  100 DEF PROCassm
  110 FOR I%=4 TO 6 STEP 2
  120 P%=0:O%=code%:[OPTI%
  130         EQUD 0
  140         EQUD initialise
  150         EQUD finalise
  160         EQUD 0
  170         EQUD title
  180         EQUD help
  190         EQUD commandtable
  200         EQUD 0:EQUD 0
  210         EQUD 0:EQUD 0
  220         ALIGN
  230 .help
  240         EQUS "Screen Grabber"+CHR$9+Version$
  250         EQUB 0:ALIGN
  260 .commandtable
  270 .title
  280         EQUS "ScreenGrabber"
  290         EQUB 0:ALIGN
  300         EQUD 0
  310         EQUD 0
  320         EQUD 0
  330         EQUD text
  340         EQUD 0:EQUD 0
  350         EQUD 0:EQUD 0
  360         EQUD 0:EQUD 0
  370 .text   EQUS "ScreenGrabber will save the current scre
en under the name 'Screen#' when Tab is pressed. The filenam
e is automatically incremented after each save."
  380         EQUB 0
  390         ALIGN
  400 .initialise
  410         STMFD   (sp)!,{link}
  420         MOV     r0,#&10
  430         ADR     r1,Interrupt
  440         MOV     r2,r12
  450         SWI     "OS_Claim"
  460         MOV     r0,#14
  470         MOV     r1,#2
  480         SWI     "OS_Byte"
  490         ADR     r0,active
  500         MOV     r1,#0
  510         STR     r1,[r0]
  520         LDMFD   (sp)!,{pc}
  530 .finalise
  540         STMFD   (sp)!,{link}
  550         MOV     r0,#&10
  560         ADR     r1,Interrupt
  570         MOV     r2,r12
  580         SWI     "OS_Release"
  590         MOV     r0,#13
  600         MOV     r1,#2
  610         SWI     "OS_Byte"
  620         LDMFD   (sp)!,{pc}
  630 .Interrupt
  640         STMFD   (sp)!,{r0-r12,link}
  650         CMP     r2,#ASC"C"-ASC"@"
  660         BNE     IntExit
  670         ADR     r0,active
  680         LDRB    r1,[r0]
  690         MOVS    r1,r1
  700         BNE     IntExit
  710         SUB     r1,r1,#1
  720         STRB    r1,[r0]
  730         ADR     r0,command
  740         SWI     "OS_CLI"
  750         ADR     r0,increm
  760         LDRB    r1,[r0,#1]
  770         ADD     r1,r1,#1
  780         CMP     r1,#ASC"9"+1
  790         MOVEQ   r1,#ASC"0"
  800         STRB    r1,[r0,#1]
  810         LDREQB  r1,[r0,#0]
  820         ADDEQ   r1,r1,#1
  830         STREQB  r1,[r0,#0]
  840 .clearIt
  850         ADR     r0,active
  860         MOV     r1,#0
  870         STRB    r1,[r0]
  880 .IntExit
  890         LDMFD   r13!,{r0-r12,pc}
  900 .command
  910         EQUS "ScreenSave Screen"
  920 .increm EQUS "00":EQUD 13:ALIGN
  930 .active EQUB 0
  940 ]:NEXT:ENDPROC
  950 DEF PROCsave
  960 OSCLI"Save $.ScreenGrab "+STR$~code%+" "+STR$~(O%+4)
  970 *SetType $.ScreenGrab &FFA
  980 ENDPROC
```

This is one of hundreds of programs available FREE for downloading on

MicroLink

In addition to these many BBC Micro programs in the MicroLink library will also run on the Electron.

Get it right!

```
 10 =    0 0 | 260 = 3169 4 |               | 750 = EBF7 E
 20 =    0 0 | 270 = FD02 D | 510 = 2E1A 4 | 760 = 3054 9
 30 =    0 0 | 280 = BA87 1 | 520 = 31B3 F | 770 = 517B 7
 40 =    0 0 | 290 =  893 4 | 530 = 5F0B F | 780 = 52DD 9
 50 = 11CA A | 300 = AED4 E | 540 = 4AB1 6 | 790 = 696B 3
 60 = C43F 3 | 310 = AED4 3 | 550 = BA0E B | 800 = DD10 5
 70 = 3029 F | 320 = AED4 2 | 560 = F0AC 4 | 810 = 8D6A C
 80 = 1FA4 2 | 330 = 146B C | 570 = 75B9 1 | 820 = E1C8 1
 90 = ED0F 3 | 340 = 5185 9 | 580 = 34EB B | 830 = 602E B
100 = AB86 D | 350 = 5185 A | 590 = 48E5 9 | 840 = F0D8 8
110 = B1F1 2 | 360 = 5185 C | 600 = 34C7 8 | 850 = E9FF 5
120 =  E08 3 | 370 = 9BF4 6 | 610 = A78B F | 860 = 1485 C
130 = AED4 F | 380 = 1C74 9 | 620 = 31B3 A | 870 = 9B10 E
140 = 5D13 0 | 390 = 24FA A | 630 = 2441 F | 880 = 74B3 3
150 = 98CE 4 | 400 = 5B39 0 | 640 = AE80 7 | 890 = 584D 8
160 = AED4 7 | 410 = 4AB1 F | 650 = C045 7 | 900 = E454 F
170 = B53F 1 | 420 = BA0E A | 660 =  6F4 F | 910 = 7BF5 1
180 = CFCD C | 430 = F0AC 2 | 670 = E9FF 0 | 920 =  94E F
190 = 1EE7 C | 440 = 75B9 7 | 680 = 4CBF 5 | 930 = 3B7C 4
200 = 5185 2 | 450 = E7F1 5 | 690 = 5764 E | 940 = 953B A
210 = 5185 6 | 460 = 3802 C | 700 =  6F4 3 | 950 =  EB7 1
220 = 24FA E | 470 = 34C7 3 | 710 = D909 F | 960 = 9A1E 3
230 = 5B46 9 | 480 = A78B 4 | 720 = 9B10 0 | 970 = BE2B D
240 = 5108 B | 490 = E9FF 5 | 730 = A8FB 9 | 980 = ED0F E
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```

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Archimedes 310 Colour System + National Panasonic 1081 Printer	£1250.00
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Available for the Archimedes offers only:

PC Emulator Software	Add £62.25
20 Megabyte Hard Disc + Controller	Add £512.00
New' CITIZEN 180E Printer 175cps, 30 NLQ	£189.00

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The big unwrap

Andrew Moore gets into the festive spirit

WHAT is the true meaning of Christmas? A mad dash to unwrap as many presents as you can in the shortest amount of time possible is certainly not the answer, but in this materialistic world it does seem as if this aspect is growing in importance. Here's a little game to give you practice in this new yuletide tradition and with luck, get it out of your system.

Mr. Guzzle has woken up on Christmas morning with a big smile on his face and a desire to open as many presents as possible. As usual, by Christmas morning the floor is almost completely covered by pine needles, and to unwrap each tempting box he must walk right around it clearing them away.

However, Mr. Guzzle remembers from previous bitter experience that the thing that slowed him up on previous festive occasions was terrible indigestion. This always occurred after consuming the inevitable tempting chocolates which are lurking around every corner on Christmas Day.

So attracted is Mr. Guzzle to these sweets that they seem to follow him down the tunnels cleared of needles, almost as if they had minds of their own. Being tempted more than five or so times will be too much for Mr. Guzzle, and his unwrapping will be over for another Christmas.

The program can run on both the Z88 and the BBC Micro. First type in Listing I, the main part of the program. Then if you are using a Z88 type in Listing II otherwise if you're using a BBC Micro enter Listing III.

You control Mr. Guzzle using A for up, Z down, comma left and dot right. If you don't like these settings you can change lines 1100 and 1110. On the Z88 these keys give you momentum in the direction you press, so that you don't have to keep hammering them for fast movement.

The game consists of an unlimited sequence of progressively harder pine cone-strewn levels. Don't hang around too long because the chocolates will become more intelligent after about a minute. Note also that you move more slowly while you are clearing the pine cones.

The implementation is fairly straightforward and, regarding efficient machine independence, the crucial feature was not referring to the screen size directly. It is kept in the variables *MAXX* and *MAXY* – these can be altered in line 1050 but should be at least eight and divisible by four.

Also the power of both machines' VDU drivers is used to encapsulate the information for defining the sprites – including colour – in a single string. For example Mr. Guzzle's face is stored in the string *US$*. This is ideal for providing efficient machine independence as once *US$* is defined, it can be used in exactly the same way on either machine in the main body of the program.

If you get tired of the levels as they are you can change the value of *G%* in line 1050. This seeds the random number generator for each level and should have a value of at least 100.

That's just about it. Remember that to succeed, you will need to do some strategic thinking as well as use dexterous finger play. Try to trap the chocolates before exposing Mr.Guzzle to them. Also, perhaps it might be worth unwrapping the furthest parcels first.

Have fun, and Merry Christmas!

Sweet strategy

The chocolates' movement strategy is a useful algorithm for many maze-style games:

- Of the four possible directions to move – up, right, down and left – look at the two which would result in moving towards the target. Choose the one in which there is currently the greatest distance between yourself and the target.
- If it is possible to move in this direction do so.
- Otherwise is it possible to move in the other direction that is towards the target? If yes, do so else don't move.
- When the chocolates become intelligent the third step is modified so that they don't just give up trying, but move temporarily away from Mr. Guzzle in the hope that they will discover another route towards him.

Turn to Page 87 ▶

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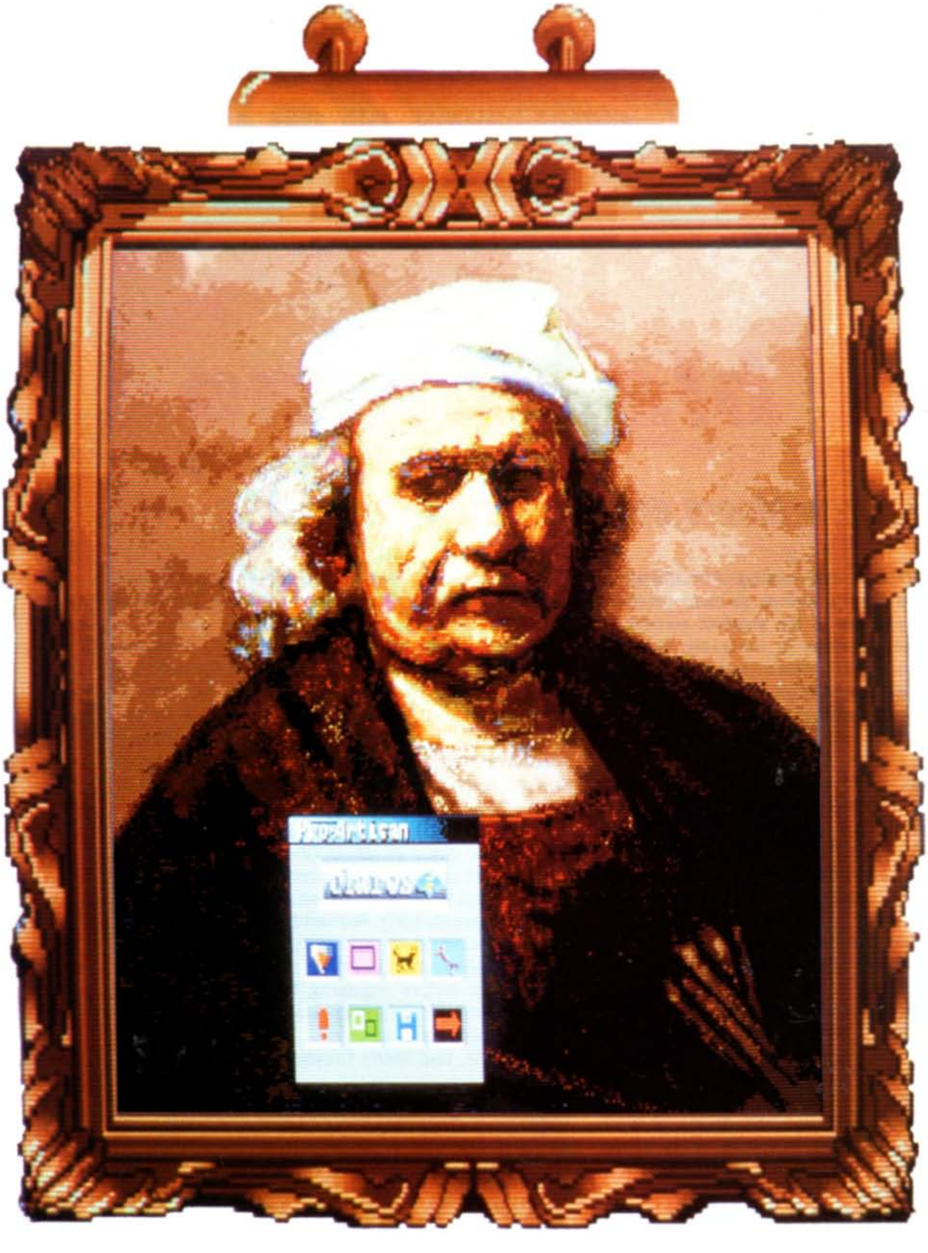

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◀ From Page 85

Listing I: Core program

```
   10 REM The Big Unwrap
   20 REM By Andrew Moore
   30 REM (c) The Micro User
   40 PROCFIRST:WAVE=0:LV=4
   50 WAVE=WAVE+1+0*RND(WAVE-G%):NP=WAVE
+2:IF NP > 9 NP=9
   60 NL=2-(NP AND 1):LSP=NP-1:TQ=300:EV
IL=0:PROCINIT:REPEAT
   70 UX=0:UY=0:UC=0:RES=0:REPEAT:PROCUS
ER:PROCLIQ:PROCDEL:TQ=TQ-1
   80 IF TQ=0 EVIL=-1:LSP=2*LSP:PROCMESS
("Too much time. Chocolates get serious"
)
   90 UNTIL RES OR NP=0
  100 IF NP>0 PROCDETH ELSE LV=LV+1:PROC
MESS("Extra Life."):PROCLIVES
  110 UNTIL LV<0 OR NP=0:IF LV<0 PROCEND
:CLEAR:GOTO 40 ELSE GOTO 50
  120 DEF PROCINIT:CLS:FOR Y=0 TO MAXY-1
:I=((2^(Y AND 7)) AND &BD)>0:IF Y>0 PRIN
T
  130 FOR X=0 TO HMX-1:Z%(Y*HMX+X)=-I:IF
 I PRINTGD$;
  140 NEXT:NEXT:PROCLIVES:I=0
  150 U=RND(HMX-3):V=RND(MAXY-3)
  160 IF FNNO(U-1,V-1) OR FNNO(U-1,V-1)
OR FNNO(U+2,V-1) THEN 150
  170 IF FNNO(U+2,V-1) OR FNNO(U-1,V+2)
OR FNNO(U+2,V+2) THEN 150 ELSE S%(I,0)=U
  180 S%(I,1)=V:R%(I)=12:PROCRECT(U-1,V-
1,U+2,V+2,10+I):PROCRECT(U,V,U+1,V+1,2)
  190 FOR J=0 TO 3:PROCP(U+U+J,V,J):PROC
P(U+U+J,V+1,4+J):NEXT:I=I+1:IF I<NP THEN
 150
  200 FOR I=1 TO 16:X=RND(HMX)-1:Y=RND(M
AXY)-1:D=2*RND(2)-2:C=RND(2):REPEAT
  210 PROCRG(X,Y):L=X+Y*HMX
  220 IF C=1 AND Y>0 AND Y<7 AND Z%(L)<>
2 Z%(L)=2:PRINTTAB(X+X,Y)WL$;
  230 R=FNM(D,0):IF R=0 R=FNM(D,0)
  240 UNTIL RND(6)=1 OR R=0:NEXT:PROCSIN
V
  250 UX=0:UY=0:UD=0:UC=1:PRINTTAB(0,0)U
S$;
  260 ENDPROC
  270 DEF PROCUSER:D=FNTD:X=UX:Y=UY:IF D
<4 IF FNM(D,0) PROCBLIP
  280 PROCRG(UX,UY):PRINTTAB(X+X,Y)US$;:
UX=X:UY=Y
  290 ENDPROC
  300 DEF FNNO(X,Y):= Z%(Y*HMX+X) > 1
  310 DEF PROCRECT(A,B,C,D,N):FOR Y=B TO
 D:FOR X=A TO C:Z%(Y*HMX+X)=N
  320 PRINTTAB(X+X,Y)GD$;:NEXT:NEXT:ENDP
ROC
  330 DEF PROCRG(X,Y):Z=Z%(X+HMX*Y)
  340 IF Z <> 2 Z%(X+HMX*Y)=0:PRINTTAB(X
+X,Y)"  ";
  350 IF Z > 9 K=Z-10:R%(K)=R%(K)-1:IF R
%(K)=0 PROCRP(K)
  360 ENDPROC
  370 DEF FNM(D,K):RX=X:RY=Y:IF (D AND 1
) RX=RX+1-(D AND 2) ELSE RY=RY-1+(D AND
2)
  380 IF RX<0 OR RX>=HMX OR RY<0 OR RY>=
MAXY THEN=0
  390 Z=Z%(RY*HMX+RX):IF K=0 THEN 400 EL
SE IF Z=0 X=RX:Y=RY:= -1:ELSE =0
  400 IF Z=2 =0 ELSE IF Z>0 PROCRG(RX,RY
):=0:ELSE X=RX:Y=RY:= -1
  410 DEF PROCLIQ:FOR I=0 TO NL:X=T%(I,0
):Y=T%(I,1):IF EVIL D=T%(I,2) ELSED=5
  420 DX=X-UX:DY=Y-UY:R=ABS(DX) > ABS(DY
):IF RND(LSP)=1 THEN 510
  430 A=D%( -( 4*(DX>0)+2*(DY>0)+(ABS(DX
) > ABS(DY)) ) ):B=A AND 3:A=INT(A/4)
  440 U=X:V=Y:IF (A EOR D) <> 2 IF FNM(A
,1) D=A:GOTO 490
  450 IF (B EOR D) <> 2 IF FNM(B,1) D=B:
GOTO 490
  460 IF NOT EVIL THEN 510
  470 IF B <> D IF FNM(B EOR 2,1) D=B EO
R 2:GOTO 490
  480 IF A <> D IF FNM(A EOR 2,1) D=A EO
R 2 ELSE D=D EOR 2:A=FNM(D,1)
  490 T%(I,0)=X:T%(I,1)=Y:T%(I,2)=D
  500 PRINTTAB(U+U,V)"  "TAB(X+X,Y)LQ$;:
Z%(U+V*HMX)=0:Z%(X+Y*HMX)=3
  510 RES=RES OR (X=UX AND Y=UY) OR (DX=
0 AND DY=0):NEXT I:ENDPROC
  520 DEF PROCRP(K):U=S%(K,0):V=S%(K,1):
FOR R=42 TO 32 STEP -1:FOR I=0 TO 3:FORJ
=V TO V+1
  530 PRINTTAB(U+U+I,J)CHR$(R):Z%(U+(I A
ND 1)+J*HMX)=0:NEXT:NEXT:NEXT
  540 NP=NP-1:ENDPROC
  550 DEF PROCDETH:FOR I=0 TO NL:X=T%(I,
0):Y=T%(I,1):PRINTTAB(2*X,Y)"  ";
  560 Z%(X+Y*HMX)=0:NEXT
  570 PROCMESS("  Wrong!! You must resis
t the tempting Chockies!  "):LV=LV-1
  580 PROCSINV:PROCLIVES:ENDPROC
  590 DEF PROCSINV:FOR I=0 TO NL:REPEAT:
X=RND(HMX-10)+9:Y=RND(MAXY)-1:UNTIL Z%(X
+Y*HMX)=0
  600 T%(I,0)=X:T%(I,1)=Y:T%(I,2)=1:PRIN
TTAB(X+X,Y)LQ$;:NEXT:ENDPROC
  610 DEF PROCLIN(L):PRINTTAB(0,L);:FOR
I=0 TO HMX-1:C=Z%(I+L*HMX)
  620 IF C=0 PRINT"  "; ELSE IF C=2 PRIN
TWL$; ELSE PRINTGD$;
  630 NEXT:ENDPROC
  640 DEF PROCEND:R=WAVE*(5+WAVE)/2-NP:R
EPEAT:IF R=1 A$="" ELSE A$="s"
  650 PROCMESS("  GAME OVER. You opened
"+STR$(R)+" present"+A$+".  "):P=INKEY(0
)=80
  660 IF NOT P PROCMESS("  GAME OVER. Pr
ess P to replay.  ")
  670 UNTIL P OR INKEY(0)=80:ENDPROC
```

Listing II: Z88 program part

```
 1000 REM The Big Unwrap - Z88 section
 1010 DEF PROCUDC:FOR I=65 TO 77:READA$:
VDU1,138,61,I:REPEAT
 1020 VDUEVAL("&"+LEFT$(A$,2)):A$=MID$(A
$,3):UNTIL A$="":NEXT:ENDPROC
 1030 DEF FNU$(N)=CHR$1+CHR$130+"?"+CHR$
(65+N)
 1040 DEF PROCP(X,Y,N):PRINTTAB(X,Y)FNU$
(N);:ENDPROC
 1050 DEF PROCFIRST:MAXX=90:MAXY=8:HMX=M
AXX/2:DIM Z%(HMX*MAXY),R%(10),T%(5,2),S%
(10,1)
 1060 US$=FNU$(8)+FNU$(9):LQ$=FNU$(10)+F
NU$(11):GD$=FNU$(12)+FNU$(12)
 1070 PROCUDC:DIM D%(7):FOR I=0 TO 7:REA
D D%(I):NEXT
 1080 WL$=CHR$1+"R  "+CHR$1+"R"
 1090 VDU 1,127,1,83:G%=1200:ENDPROC
 1100 DEF FNTD:A=INKEY0:IF A=65 UC=0:=0
 1110 IF A=90 UC=2 ELSEIF A=44 UC=3 ELSE
IF A=46 UC=1 ELSEIF A=32 UC=4
 1120 =UC
 1130 DEF PROCLIVES:FOR J=0 TO 6:IF LV>J
PRINTTAB(91,J)US$ ELSE PRINTTAB(91,J)SP
C2;
 1140 NEXT:ENDPROC
 1150 DEF PROCDEL:ENDPROC
 1160 DEF PROCMESS(S$):L=LENS$:PRINTTAB(
HMX-L/2,7);:FOR I=1 TO L
 1170 VDUASCMID$(S$,I):NEXT:FOR I=0 TO 7
77:PROCDEL:NEXT:PROCLIN(7):ENDPROC
 1180 DEF PROCBLIP:VDU1,52,33,33,33,35:E
NDPROC
```

Listing III: BBC Micro program part

```
    1 MODE1:VDU23;8202;0;0;0;0;19,1,2;0;
    2 IFPAGE<>&E00 GOTO3000
 1000 REM The Big Unwrap-BBC dependent s
ection
 1010 DEF PROCUDC:FOR I=240 TO 252:READ
A$:VDU 23,I:REPEAT
 1020 VDU FNX(EVAL("&"+LEFT$(A$,2))):A$=
MID$(A$,3):UNTIL A$="":NEXT I:ENDPROC
 1040 DEF PROCP(X,Y,N):PRINTTAB(X,Y);CHR
$(240+N);:ENDPROC
 1050 DEF PROCFIRST:MAXX=36:MAXY=20:HMX=
MAXX/2:DIM Z%(HMX*MAXY),R%(10),T%(5,2),S
%(10,1)
 1060 PROCU(2,248,249):US$=A$:PROCU(2,25
0,251):LQ$=A$:PROCU(1,252,252):GD$=A$
 1070 PROCUDC:DIM D%(7):FOR I=0 TO 7:REA
D D%(I):NEXT
 1080 VDU23,253,&FF,&FF,&E7,&C3,&C3,&E7,
&FF,&FF:PROCU(1,253,253):WL$=A$
 1090 G%=600 : ENDPROC : REM Also kill t
he Cursor
 1100 DEF FNTD:IF INKEY(-66) THEN =0
 1110 IF INKEY(-98) THEN =2 ELSEIF INKEY
(-103) THEN =3 ELSEIF INKEY(-104) THEN=1
 ELSE =4
 1130 DEF PROCLIVES:FOR J=0 TO 6:IF LV>J
 PRINTTAB(10+3*J,28)US$; ELSE PRINTTAB(1
0+3*J,28)"  ";
 1140 PRINTTAB(0,28)"Lives: ";:NEXT:ENDP
ROC
 1150 DEF PROCDEL:FOR I=0 TO 200:NEXT:EN
DPROC
 1160 DEF PROCMESS(S$):PRINTTAB(0,24):IF
 LEN(S$)<38 PRINTS$ ELSE PRINTLEFT$(S$,2
6) : PRINT"  ";MID$(S$,26)
 1170 FOR I=0 TO 4E3:NEXT:PRINTTAB(0,24)
SPC(38)TAB(0,25)SPC(38):ENDPROC
 1180 DEF PROCBLIP:ENDPROC
 1190 DEF FNX(X) : A=X AND 48 : B=X AND
12 : C = X AND 3
 1200 = 4*A + 2*(X AND 16) + 2*B + 2*(X
AND 2) + C
 1210 DEF PROCU(A,B,C):A$=CHR$(17)+CHR$(
A)+CHR$(B)+CHR$(C)+CHR$(17)+CHR$(3):ENDP
ROC
 2000 REM Data for The Big Unwrap
 2010 DATA 3F2C2C3939323224,3F26260C0C19
1932,3F131326260C0C19,3F0909131327270D
 2020 DATA 242929333326263F,322424090913
133F,193232242409093F,0D1919333325253F
 2030 DATA 0F19313F2F311C0F,3C26233F3D23
0E3C,2123373F3B372321,21313B373F3B3121
 2040 DATA 1003300A0A210C13
 2050 DATA 9,6,1,4,11,14,3,12
 3000 *KEY0 *TAPE|MFORI%=0 TO TOP-PAGE S
TEP 4:I%!&E00=I%!PAGE:N.|MPAGE=&E00|MO.|
MRUN|M
 3010 *FX138,0,128
```

The land of Shades

by someone who has been there and survived

I AM Whirlwind: I have been sent to tell you of Shades, a wide land wherin lies great treasure – and great danger too, if you wander around with your eyes closed and no thought of any worth in your head.

To start you must know how to enter the land. When you first play, you will have neither rank, honour nor any points. You will be a Novice and utterly useless. Therefore speak sweetly to others, and do not puff up with boasting, and maybe they will help you.

But if they will not, you had better know how to get around and get treasure. You can move in many ways by typing GO NORTH, GO UP, GO SOUTHWEST and all other directions. But you can also enter N, U and SW, which is quicker. OUT works from nearly everywhere and is good for retracing your steps if you get lost.

At first you will wish to stop and gawp at the wondrous things, and truly the descriptions of locations in Shades are lengthy and full of interesting information and clues.

But if you type BRIEF you will see only the name of your current location – you can see a full description by typing LOOK instead. This is useful, for you will move around quicker, and not have to cope with lots of words on your screen when you have to run fast from evil fighters such as Minotaur, whose name is a byword for cutting people into small bits.

When you find an object you must pick it up: So type GET (object). Not all objects are valuable: If you type GET T (for treasure) that is a quick way to tell if the object is worth anything. Then when you have it, type VALUE (object) to find its worth. Take it to the Mad King's Room, where if you drop it you will be given points for your deed, and may presently advance in rank and power.

The Mad King's Room is to the east of the courtyard in the castle, so you will not miss it. But if the drawbridge is raised you may not enter. Therefore go south from the drawbridge and you will find a way of lowering it.

That is all I can tell you for now, but I will return in the cycle of a moon and speak on matters of glory and honour: How to make a name for yourself in battle, unlike the fool Murrough, who sitteth in a safe place always and never dares risk his unlovely skin.

Until then, may the goddess protect you.

How to access Shades using your micro, a modem and a telephone line:

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The opening location in Shades

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A pocket full of data

John Allen investigates the newest Z88 plug-in

Product: zBase
Price: £69
Supplier: Wordmongers, 21 Edison Road, Rabans Lane, Aylesbury, Buckinghamshire HP19 3TE.
Tel: 0296 437878

SPECIALISED software is starting to become available to plug the cracks in the applications supplied as standard on the Z88. I suppose the most significant so far are Wordmongers' Z-term for communications, Computer Concepts' Spell-Master for serious word-processor users and now, also from Wordmongers, a database – zBase.

Of course PipeDream can be considered to be a simple database, but really the facilities are not particularly comprehensive, and someone used to a dedicated package such as ViewStore will find it poor so zBase is intended to fill that gap. Like System Delta and Inter-Base on the BBC Micro, zBase has its own programming language to give maximum flexibility in adding records and using data. It is unashamedly based on the PC's dBase II.

In order to use zBase you will need at least 128k of ram. The software comes on a 32k eprom and installs itself as an activity in the Z88 Index, just like PipeDream and Basic, so it can be used either by entering individual commands to be executed immediately, or by running a program – called a command file – which has been saved as plain text from PipeDream.

The commands are not unlike many of those in Basic and so quite easy to learn. The big but, however, is that although all the tools for comprehensive handling of databases are provided there's no Card Index program or other easy mechanism to interactively create, or add to, a database.

Databases in general have items of data – maybe a name – each of which constitutes a field. A collection of related fields – say someone's name, address and phone number – is a record and it is these records which are stored in the database file.

When creating a database the first thing you need to do is to define a standard record. In zBase this is done by preparing a file in PipeDream which has one line per field and that contains the name of the field – either a string or number. Strings end in *$* and are followed by the maximum length.

To initialise the database zBase's CREATE command is used and the next stage is to put records into it. For example the series of commands:

```
APPEND BLANK LET 1:NAME$="J
ohn Allen" LET 1:ADDRESS$="
c/o The Micro User" LET 1:P
HONE$="0625-878888"
```

Here APPEND adds a blank record, 1 is the file – zBase allows 2 databases to be open at any time – and *NAME$*, *ADDRESS$* and *PHONE$* are the names of the fields. Adding records in this way is really rather tedious so in practice it would be better to write a program which requests these items of information, and constructs a record from them.

As in most databases, zBase records can be sorted into order by using an index file, one which holds the information for just one of the fields of each record sorted into order, for example names arranged alphabetically – together with a pointer to show where to find the rest of the record in the main file. This provides a mechanism to retrieve things from the database and display them on the screen.

It's most likely that a database on the Z88 will be used in conjunction with one on another machine, so how easy is it to get information in and out of zBase? To and from PipeDream – or View Professional – it's very easy. The COPY TO and APPEND FROM commands can create and use files that are in PipeDream plain text format. That is, each field is separated by a tab character and each record by a carriage return.

One useful consequence of this is that zBase data can be entered into a PipeDream file and then appended to a database rather than via a

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◄ From Page 89

specially written program. In the other direction you need to remember to set the PipeDream column widths to match the length of the zBase fields in order for records to be displayed correctly.

COPY TO and APPEND FROM will also work with the information in delimited form, where each field is separated by a comma. This is useful, for example, to provide addresses for a mail-merge in View, or for transferring to or from Viewstore where files are stored in a similar format but, unless you're lucky, conversion can be messy.

Either of the formats can be used with Inter-Base but a simple Inter-Base program is required to take a zBase record and write it to an Inter-Base one and vice versa.

In fact, if you're prepared to write the programs, Inter-Base and zBase are extremely well suited to each other. Files can be produced by a program in one and picked up by a program in the other, so if you've a database on one machine which you want to use on the other, your own customised programs can make the conversion very easy.

The quality of the manual can make or break a database. Whatever anyone says they are never easy to use, so you need clear, easy to read documentatioon both to teach you how it works and as a constant reference when things begin to go wrong. The review version of zBase only had a provisional manual with it, but I did find it lead me gently through the learning process.

It contained lots of useful example programs and although I expected it to assume knowledge of dBase II – making it harder to understand for BBC Micro users – it seems to have avoided that pitfall.

So is zBase worth getting? Yes, if you're a serious database user and want to carry part of a large database around with you. The facilities are good and comprehensive. If you're just a dabbler you might well be best to stick with PipeDream: In order to get the best out of zBase you really will have to write some programs yourself.

SYSTEM LIMITATIONS

*The size of a **zBase** database is limited to 65535 records per file and the maximum number of fields per record is 32 with a largest string variable length of 255.*

***ViewStore** allows files up to 4096 Mb – if you have such a large drive – with 254 fields and 239 as the maximum record size.*

*Records in **Inter-Base** are constrained only by the memory size of your machine. Similarly the file size – and therefore the number of records per file – depends on the disc storage available.*

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GRAPHICS PACKAGE

Imagine Quest Paint re-written to take advantage of the high resolution of Mode 0, well this is it. The Wapping Editor could well be worth buying for this section alone. This must surely be the graphics.

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Once captured, Video images can be stretched, squahsed, rotated, stored on disk, printed, or used by applications software.

Applications include desktop publishing, graphics, animation, image analysis and recognition, medical imaging, automatic inspection and measurement, databases, interactive video, remote transmission of pictures via a modem, movement detection ... or anything else you can think of!

SPECIFICATION

SOFTWARE

All the driver software for the digitiser is contained in a ROM on the podule. Facilities provided include:

- Grabbing of images to the screen or dumping to memory.
- Continuous grabbing and display for previewing or camera alignment.
- 'Hot key' grabbing – pressing a (configurable) key combination grabs and displays an image on the screen while another program (e.g. paint software such as Artisan) is running.
- Scaling (zoom/shrink) any section of an image to any size in X and Y directions, with optional X/Y flip, window clip and logical (AND/OR/XOR) plotting.
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- Very versatile matrix printer screendump facility for Epson FX, LQ and EX compatible printers – pictures can be printed to ANY size (including multiple sheets) at any orientation, using any available printer density and one of six internal sets of dot patterns, or with user definable patterns (pattern editor supplied). The screen-dump can also be used for general purpose graphics screen printing.
- Pixel value lookup tables: pixel values can be passed through a user defined lookup table to allow contrast enhancement, thresholding pseudo-colouring etc.
- Smoothing and noise spot removal to enhance image quality.
- Creation of sprites from all or part of a digitised image.
- Saving and loading of digitised images in compressed format.
- Combination of pictures by adding, avaraging, subtracting, multiplication etc.
- Much faster versions of the Arthur *ScreenLoad and *ScreenSave commands.

Software facilities are accessed via operating system star (*) commands and SWI calls. High resolution screen modes using MultiSync type monitors are supported.

UTILITY DISK

A disk is included, containing sample pictures, examples and utility programs including the following:

- Colour image grabbing using colour filters with monochrome or colour cameras, including colour balance adjustment and scaling facilities.
- Pattern editor for 2 colour display modes and printer screendumps.
- 512 line interlaced display for non MultiSync monitors.
- Thresholding to create two colour images.
- Capture and replay of animated sequences.
- Several example programs illustrating the use of digitiser software.

RESOLUTION

Images are digitised to 512 (h) x 256 (v) pixels, and then scaled to fit the Archimedes' screen. It is possible to digitise to 512 x 512 pixels if the picture is stationary for about 0.1 second. 512 x 512 images can either be displayed on a MultiSync monitor, or on a normal monitor using interlacing.

Pictures are digitised to 64 levels of grey (6 bits). Note, however, that it is only possible to display all 64 levels on a monochrome monitor, or a colour monitor which has a composite (CVBS) input. For this reason, the Philips CM8533 monitor is recommended instead of the standard Archimedes monitor. It is also possible to connect both a colour and a monochrome monitor at the same time.

Any 2,16 or 256 colour graphics mode can be used to display digitised pictures. In two colour modes, grey levels are represented using dot patterns, which may be redefined if required (a pattern editor is supplied).

Cont.

SPEED

Video fields are captured in real time (1/50th sec.), and then transferred to Archimedes' memory or the screen. The grab/display rate is dependant on the screen mode and picture size, up to 25 fields per second for quarter screen images, or 12.5 per second for fullscreen (Mode 9).

HARDWARE

The digitiser is a single width podule, with a BNC socket on the rear panel for the video input, which may optionally be terminated via a link. There is 128K of on-board memory to store the digitised image, and a 32K ROM on the podule contains all the driver software.

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(030) 7952057.

Lendac Data Systems, Unit 31, IDA Enterprise
Centre, Pearce Street, Dublin 12. Tel: 710796.

Lindis International Ltd, Wood Farm, Linstead
Magna, Halesworth, Suffolk. Tel: 098 685 476.

Scientex P.V.B.A., Zilversmidstraat 2, B-2000
Antwerpen, Belgium, Tel: 03 233 59 06.

Techno-matic Data, Holbergsgade 19, 1057
Kobenhavn K, Denmark.

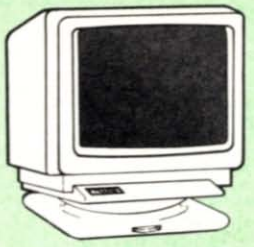
*Velobyte, Scheaedyksadyk 5a-6a, 3011 EB
Rotterdam, Holland, Tel: (010) 413 8197/414
5171.

Viking Tecno, Vestergade 12.1, 9620 Aalestrup,
Denmark, Tel: 08 642522.

*Acorn/Watford Referral Centres.

Continued ⟶

MONITORS & SWIVEL BASES



All Monitors are supplied complete with BBC connecting leads FREE.

MICROVITEC 14"

● 1431 – Standard resolution as used on the BBC television computer programme	£175
● 1451 – Medium resolution, suitable for word processing in mode 0	£219
● 1441 – High res, exceeds the capabilities of the BBC micro	£359
● 1431AP RGB + PAL and AUDIO	£199
● 1451AP RGB + PAL and AUDIO	£255
● **2030 CS 20" Med Res**	**£380**
● **2040 CS 20" Hi Res**	**£675**
● Dust Cover for Microvitecs	£5.50
● **Touchtec 501 Touch Screen**	**£239**

TAXAN 12" & 14"

● **TAXAN Super Vision 2 Type 620** Hi-res RGB Colour monitor. Ideal for Wordprocessing	£263
● **TAXAN Super 3, Type 625** Ultra Hi-res, RGB Colour) Text mode switch allows monochrome text display in Green, Amber, White reverse or White on Blue	£313
● **TAXAN 14" Multisync 770 Plus** – An autoscanning Ultra high res, colour monitor. Ideal for Archimedes, IBM & Compatibles	£479

● **NEC JC-1402P 14"** Multisync II Ultra Hi-res Intelligent Colour monitor. Auto scans frequencies between 15KHz to 35KHz. Text switch provides 7 colours for Database & wordprocessor.	£475

PHILLIPS

● BM7502 12" Hi-res Green Monitor	£65
● CM8833 14" Med. Res Colour Monitor	£219

STAR BUY

● **PHILLIPS 14"** Medium Res, dark glass, attractively finished Colour Monitor – supplied complete with RGB, SKART and Audio/Phono Inputs. A push-button switch toggles between Hi-Res monochrome green text mode and full colour display. (Please state the type of Connecting Lead you require).

ONLY £195

Dust Cover for Phillips Monitors	£6

NEW

SPECIAL OFFER

AMBER MONITOR

BT MERLIN/Acorn 12" Hi resolution Amber monitor. Ideal for wordprocessing. Consealed front panel mounted controls. Illuminated mains on/off rocker switch. Supplied complete with BBC Cable.

Only £49
(Offer valid while stocks last)

N.B. carriage on Monitors £7 (securicor)

A range of IBM PC Compatible monitors, both monochrome & Colour are now available. Please write in for our descriptive PC brochure.

SPARE LEADS

BNC Lead for Zenith or Philips	£3
Skart Monitor Lead	£5
RGB lead for TAXAN Monitors	£3
Archimedes Colour Monitor Lead	£7.50

By placing your monitor on one of our professional swivel bases (see monitors drawing on the left), you gain the freedom to adjust the monitor viewing angle to suit your needs and thus alleviate eye strain and reduce back stress. The front mounted adjustable control dial makes adjusting the monitor viewing angle very simple.

for 12" Monitors **£7** (carr. £2.50)
for 14" Monitors **£10** (carr. £2.50)

Anti-Glare VDU Screen

These extremely effective, easy to install, 12" & 14" VDU screens eliminate harmful glare, improves contrast on colour monitors. Increases productivity in offices. A must for all wordprocessor users. Hundreds of these screens are in daily use in various branches of one of the leading High Street banks.

£12

TAXAN KP-815 PRINTER

80 column, Bi-directional, 160 CPS, (NLQ 24cps); Friction & tractor feed + paper roll holder as standard; Epson FX compatible.

Offer Price £155

Taxan KP915 132 Column Printerr (carr £7)	£275
RS232 Interface	£49
RS232 Interface with 2K Buffer	£69
RS232 Interface with 16K Buffer	£89

Panasonic KX-P1081

Attractively finished in BBC beige. Bi-directional, logic seeking. Has IBM and Epson RX compatible command calls. Speed: 120CPS draft mode, 24 CPS NLQ mode. Character width range from 5 cpi to 17 cpi. Upto 40 downloadable characters. Functions include, Proportional spacing, Justification, centering and left & right ranging.

(Price inludes, FREE a 4ft Printer Lead, and a Dump Out 3, Screen Dump ROM worth £35 with every printer purchased from us).

Special Price: **£145** (carr. £6)

Optional RS232 Interface:	£39

Panasonic KX-P3131 Daisy-Wheel Printer

Low-cost, high performance; Bi-directional, Logic seeking, Proportional spacing, 10, 12 & 15 CPI, Speed 17CPS. 6K Buffer.

Only **£255** (carr. £7)

Tractor Feed	£90
Daisy Wheel (various)	£12
Ribbons: Standard **£4.50**; Long Life **£7**	
Extra 32K Printer Buffer (internally fitted)	£13

RS-232 GENDER CHANGERS

Male to Female	£6.95
Female to Male	£6.95
Male to Female	£6.95

Panasonic KX-P4450 LASER PRINTER

Latest technology at affordable price. Prints 11 pages a minute, Two A4 size paper bins, Serial & Parallel ports, 512K Buffer – expandable to 1.5Meg, 15 Character LCD Display, Diablo 630, Epson FX-286, IBM Proprinter, HP Laserjet emulations, 5K pages per month duty cycle.

ONLY £1,469

Toner for KX-P4450 **£29**

NEC P2200 PINWRITER

24 pin; 80 column; 168CPS – 56CPS LQ; Epson LQ compatible, 7K Buffer; 7 resident FONTS, Friction & Tractor feed, front load single sheet feed, etc.

Price: £269

FREE Price includes a Free BBC Cable.

Cut Sheet Feeder	£59
Pinwriter Serial Interface	£55
Additional Font Cartridge	£25
NEC P2200 Pinwriter Ribbon	£6

NEC PINWRITER P6/P7 Plus

The Ultimate matrix Printer for Business.

24pin printhead; Print speed, 265cps Draft, 90cps LQ; Inbuilt Tractor & Friction feed; A paper park & low tear facility; 20 inbuilt FONTs; A font cartridge facility; 8K of printer buffer; colour option available.

P6 Plus 80 columns	£439
P7 Plus 136 columns	£575
Cut Sheet Feeder	£125
Colour Option	£74
Serial Interface	£73

EPSON PRINTERS

EX800	£405	LQ850	£469
EX1000	£545	LQ1050	£585
FX850	£315	LQ2550	£899
FX1000	£425	LX800	£175
GQ3500 Laser	£1249	SQ2500	£975
LQ500	£285		
Star LC10	**£185**	**LC10 Colour**	**£229**

PLOTTERS

Hitachi 672 Colour Plotter	£475
Plotmate Plotter A4S	£379
Plotmate Plotter A3M	£549

CUT SHEET FEEDERS for

EX800 **£149**; EX1000/LQ2550 **£210**; FX800 **£149**; FX1000 **£179**; LQ/LX800 **£139**; LQ500 **£75**; LQ850 **£135**; LQ1050 **£175**.

TRACTOR FEED for

EX800/1000 **£85**; LQ800 **£44**; LQ850 **£69**; LQ1050 **£85**; LQ2500 **£195**

ACCESSORIES

● EX800/1000 Colour Option	£55
● EX800/1000 Colour Ribbon	£18
● LQ2500 Colour Option	£65

(Securicor Carriage on Printers £7

EPSON PRINTER INTERFACES

All these interfaces fit inside the printer.

RS232	£32	RS232 + 2K Buffer	£52
IEEE 488	£40	RS232 + 8K Buffer	£79

Universal Printer Sharers/Changers

Connect upto 5 Micros to 1 printer or 5 Printers to 1 Micro with our combined, Sharer/Changer. These Units are made to a very high standard. For extreme reliability, they all have Printed Circuit Boards mounted inside the case, (not a Spagetti Junction of wires). Internal connection is made via high quality ribbon cables.

(Ideal for School environments.)

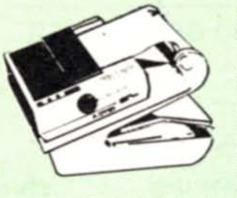
Connects	Serial	Centronics
2 to 1	£22	£23
3 to 1	£30	£32
5 to 1	£40	£42

(Cables extra at £6 each. Please specify type required when ordering)

INTEGREX COLOUR JET PRINTER

● Colour Jet 132 Printer	£515
● Paper Roll	£6
● Screen Dump Software	£10
● Colour Cartridge	£14
● Black Cartridge	£8
● 100 A4 OHP transparencies	£55
● 8K Serial Interface Optional	£99

Professional Printer Stand



This new professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Additional facilities include: Easy access to paper from both sides, used with both top and bottom feed paper and with its dial controlled paper feed system with adjustable deflector plates it ensures smooth paper flow and automatic refolding.

***80 Column version £23** (carr. £2.50)*
***132 Column version £26** (carr. £2.50)*

PRINTER LEADS

BBC Centronics 4' long	£5
BBC Centronics 6' extra long	£7
Compact's Special Centronics Lead	£7
Archimedes Printer Lead 1 meter	£7
IBM Parallel Lead 1 meter	£7
Double Ended 36 way Centronic Lead	£9
RS232 Leads (Various)	P.O.A.

PRINTER RIBBONS & VARIOUS DUST COVERS

Type	Ribbons	Dust Covers
BBC Micro	–	£3.50
BBC Master	–	£4.00
Archimedes Micro pair	–	£9.00
IBM PCs pair	–	£6.00
Brother HR15/20	£3.00	£5.00
DMP2000	£3.75	£4.75
EX/LQ800	£4.50	£4.50
EX/LQ1000	£7.50	£5.00
RX/FX80/85/800/MX80	£3.90	£4.95
RX/FX100/1000	£5.75	–
Kaga/Taxan KP810/815	£4.90	£4.00
LC10 (Black)	£4.25	£5.00
LQ500/800	£3.75	£5.00
LQ1050/LQ2500	£8.50	£5.50
LX80/86/800	£3.80	£4.50
M1009/GLP	£3.80	£3.75
Panasonic KX1080/81	£4.00	£4.75
SQ2500	£23.00	£5.50
Star NL10	£3.75	£4.50
Olivetti Ink Jet Cartridges (set of 4)	£9	

Our attractive Dust Covers are manufactured from translucent PVC. The seams are stitched and edges are taped to prevent splitting due to continuous use.

Listing Paper (Perforated)

● *1,000 Sheets 9½" × 11" Fanfold Paper*	*£7*
● *2,000 Sheets 9½" × 11" Fanfold Paper*	*£12*
● *1000 Sheets 9½" x 11" NCR 2 Part Fanfold*	*£19*
● *1,000 Sheets 15" × 11" Fanfold Paper*	*£9*
● *1000 Sheets true A4 Fanfold Paper*	*£11*
● *2000 Sheets true A4 Fanfold Paper*	*£19*
● *Teleprinter Roll (Econo paper)*	*£4*

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50. 2K Sheets £3.00

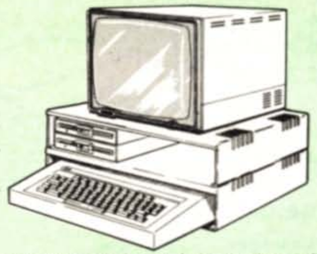
PRINTER LABELS

(On continuous fanfold backing sheet)

1,000 90 × 36mm (Single Row)	***£5.00***
1,000 90 × 36mm (Twin Row)	***£4.90***
1,000 90 × 49mm (Twin Row)	***£7.50***
1,000 102 × 36mm (Twin Row)	***£6.25***

Carriage on 1,000 Labels £1.00

PLINTHS FOR BBC MICRO, MASTER & PRINTERS

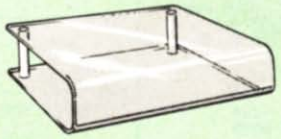


Protect your computer from the heat of your VDU. Our micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and VDU, whilst the double height version provides enough room for our stacked disc drive and other peripherals like, Eprom programmer, music unit or simply discs & stationary. The computer slides neatly in the lower section allowing easy access to remove the lid.

The single printer stand is equally sturdy but instead of cooling slots it has elegant cutouts on the sides. This allows easy access to paper from all sides. Colour: BBC Beige.

Single BBC Plinth	**£12** (carr. £2)
Double BBc Plinth	**£20** (carr. £3)
Printer Plinth	**£12** (carr. £2)
Single Master Plinth	**£13** (carr £2)
Double Master Plinth	**£24** (carr £3)

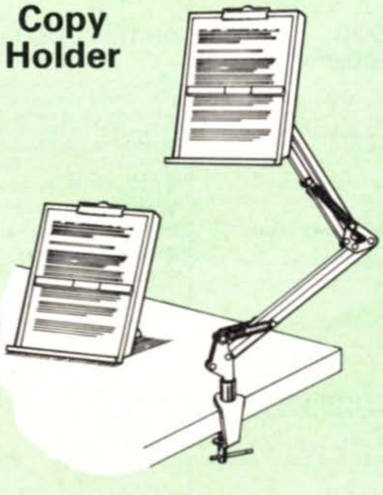
Perspex Printer Stand



Give your Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand. The printer sits on top and the fanfold paper rests neatly underneath, thus occupying the same space as the printer footprint.

Only: £16 (carr. £3)

Copy Holder



Whether you want to type in your latest program or the draft of a new trilogy, Watford's manuscript holders are superb for holding your paper at the ideal height and angle to allow you to read and type in ease and comfort.

Available in 2 full A4 versions, desk resting and shelf clamping. Paper is held firmly by means of a plastic retaining ruler and a clip grip. (for resting books or magazines, the desk top version is recommended).

Desk Top **£10** (carr. £2)
Angle poise **£14** (carr. £3)

MEGABUFFER 256

The Smallest 256K Printer Buffer Unit in the world 38mm x 130mm x 134mm.

This new Megabuffer 256 from Watford is a full featured 256K Printer Buffer. It allows the computer to print 256,000 character in a short time thus freeing the computer very quickly. In short it makes light work of printing large documents, screen dumps, etc. It is extremely simple to connect. The features are:

- ● Improves efficiency by making more efficient use of computer and printer.
- ● Compatible with any computer and printer that uses Centronics Parallel connections including all BBCs, IBM PCs, etc.
- ● Total compatibility with all software.
- ● Cheaper phone bills when using your Modems.
- ● Ideal for those doing large graphics screen dumps that are slow to print.
- ● Multi-Copy facility allows you to print several copies via Megabuffer without going through your computer.
- ● Data Dump facility is included.
- ● Built in test unit for both the buffer & your printer.

In conclusion it can safely be said that MEGABUFFER 256 is the ultimate printer Buffer for both the amateur and professional user.

Only £149 (carr £2)

OKIMATE COLOUR PRINTER

The first ribbon transfer printer in its price range which offers fully versatile colour or black printing. A 24 element print head produces more than 100 shades with exceptional clarity. Ideal for use with Quest Paint or AMX Super Art.

Only: **£119**

BBC Screen Dump	**£10**
Colour Ribbon	**£6**
Black Ribbon	**£6**

THE EPSON RX-FX-KAGA PRINTER COMMANDS REVEALED

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out. Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible Printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from BASIC and Wordwise.

It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

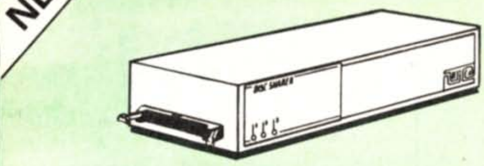
£5.95 (No VAT)

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

Continued ⟶

NEW

DISC DRIVE SHARER



(Ideal for educational establishments)

At last, a low cost alternative to the Econet system. Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disk, and red means that you are next in line. The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not for use with ADFS.)

Launch Price: **£65** Price includes 3 Cables

NOW WITH EXTRA FEATURES AT NO EXTRA COST – Watford's latest DFS 1.44

- Incorporates Acorn's Official Tube Host Code so that those with 2nd processors no longer need to waste a ROM socket on the DNFS.
- Option to DOUBLE the speed of BPUT and BGET.

WATFORD's & ACORN's SINGLE DENSITY DFS

Watford's popular and widely acclaimed DFS has now been available for six years and has gained a large following amongst serious and educational users of the BBC Micro. Owners of Acorn or any other standard DFS can upgrade to our "Ultimate" DFS merely by replacing their DFS ROM. See below for this upgrade. ***(P.S. Watford's highly sophisticated DFS is fully compatible with Acorn standard DFS). (while Acorn's 1770 DFS is fully compatible with Watford's Mk II DDFS)***

- *Complete Disc Interface Kit including DFS ROM and fitting instructions* **£48**
- *Acorn's 0.90 DFS Kit complete* **£49**
- *DFS Manual (Comprehensive)* *(no VAT)* **£6.95**

(P.S. Our DFS manual is the only comprehensive Manual available for the BBC micro and covers both Acorn & Watford DFSs).

- *Watford's sophisticated DFS ROM only* **£16**
- *We will exchange your existing DFS ROM for Watford's Ultimate DFS ROM for only* **£12**
- *DNFS ROM only* **£17**
- *ADFS ROM only* **£25**

NEW

Watford's MkII 1770 Double Density DFS Interface

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1770 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1770 DFS, plus the added features:

Added features include:

- Acorn ADFS compatible – Use ADFS on our DDFS board.
- Tube host Code – No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing – no need to fuss with 40/80 track switches (even works with protected disks).
- An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
- New low profile – small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations – BPUT and BGET.
- Operates in both single and double density modes.
- OSGBPB has been recoded, increasing still further the speed of file handling.

Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!

If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only **£30.00**.

- Special introductory offer **£39.00**
- DDFS Manual (No VAT) **£6.95**
  - We will exchange your existing DFS Kit for our sophisticated DDFS for only **£25.00**

Please note, as the MkII DDFS is a hardware and software upgrade, it is not possible for existing Watford DDFS users to simply exchange their ROM for the new version.

DUST COVERS (For our Disc Drives)

Single CLS (without PSU) **£3.20** Twin CLD (without PSU) **£3.85**
Single CS (with PSU) **£3.95** Twin CD (with PSU) **£3.90**

Special 40/80 Disc Drive/DDFS Mk II Offer

- The popular 40/80 track 400K single Disc Drive, Double Sided, cased with Cables. Plugs directly to your Micro.
- Watford's extremely popular DDFS Disc Interface (allows 720K storage). Will run in both, Single & Double Density modes.
- A comprehensive User Friendly Manual.

A Bargain at Only **£125** (£6 carr)
(Offer valid while stocks last)

3½" DISC DRIVE OFFER

These top quality 3½" Double sided, 80 track, 1 Megabyte (unformatted each Disc Drives), are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc. They run directly from the BBC B/Master's own PSU.

CLS35 400K Unit	**£69**
CLD35 800K Unit	**£126**

Mysteries of Disc Drives & DFS Revealed

Are you tired of faulty cassettes, and lengthy loading times? Do you want to upgrade your BBC micro to take discs but you get tied up in the plethora of jargon surrounding the choice and use of these systems.

Then The Mysteries of Disc Drives and DFS Revealed is the book for you. It explains in detail the different types of systems available, how they are installed and how to use them. Many examples are given including pre-written programs to call various functions of the DFS available only through Operating System calls. Different types of disc, 40/80 tracks etc. are all explained. This book is ideal for the beginner confused by the plethora of choice available in the marketplace.

£5.95 (Book No VAT)

DISC ALBUMS

Attractively finished in black leather look vinyl. Stores upto 20 Discs. Each disc can be seen through the clear view pocket.

£4

FLOPPY HEAD CLEANER KIT

The heads in floppy drives are precision made and very sensitive to dirt. The use of a cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. It is very simple to use. Available in 3½" & 5¼", please specify.

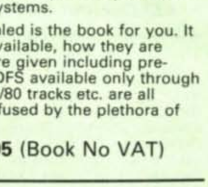
£6

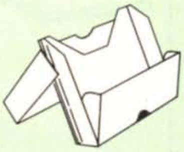
ANTISTATIC LOCKABLE DISC STORAGE UNITS

Gives double protection – Strong plastic case that affords real protection to your discs. Antistatic helps avoid data corruption whilst in storage. The smoked top locks down. Dividers and adhesive title strips are supplied for efficient filing of discs.

M35 - holds upto 50 5¼" discs	**£6.00**
M85 – holds upto 95 5¼" discs	**£8.00**
M25* – holds upto 25 3 ½" Discs	**£5.50**
M50 – holds 50 3½" Discs	**£7.50**
M10 – holds upto 10 Data Cartridges	**£15**

* Not lockable





PLASTIC LIBRARY CASES

Holds up to 10 5¼" Discs. **Only £2.00**

DISC PLONKER RACK

When using ones micro, there is a tendancy to have more than one Disc on the desk. This exposes them to the hazards of fingerprints, scratches, dust, coffee and an untidy desk.

Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. It holds up to eight 5¼" Discs.

Protection at Only: **£2**

Quality Disc Drives from Watford

To help you decide which drive is the most suitable for your needs (and your pocket!), we have produced the table below.

The first capacity given in the first column indicates capacity in single density mode. That within the brackets is the capacity in double density mode. All disc drive type numbers start with the prefix "C".

The tinting on some of the boxes is used to indicate which Drives are 40 track (non-tinted) and which are 80 track (tinted). All our 80 track drives are already fitted with a 40-80 select switch.

***All our Disc Drives are Double Sided and will operate in both Single and Double Density modes.** Extensive experience of the usage of disc drives suggests that the JAPANESE drives currently represent about the best in terms of speed, reliability and overall "elegance" available for the BBC Micro.*

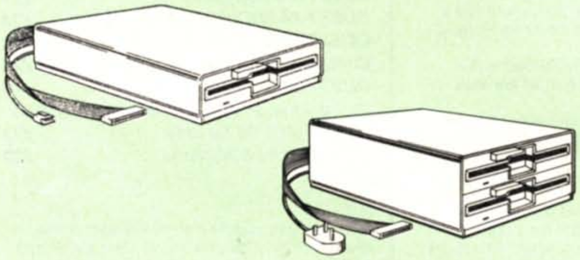
Various UK "manufacturers" of disc drives for the BBC micro (more accurately, "packages" label other manufacturers drives with their own name). We buy the high quality NEC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, some of the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. Ideal for Schools & Colleges. We are now able to supply all single disc drives with Power Supply, in either single or dual case. (Dual case has a twin data cable and a power supply capable of driving two disc drives) allows easy expansion to a dual drive unit, at a later date. Prices stated in the pricing boxes below are for single drives in standard single cases. Single drives in a dual case cost an extra £5. (At Watford we anticipate your needs of tomorrow, not just today)!

When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space) your BBC, Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with Watford plinth. (Turn to the 5th page of our advert for the Plinths).
P.S. All our 5¼" Disc Drives with PSU are compatible with the Compact Micro. All you require is the special Compact Disc Drive Cables designed by us.

Our Disc Drives conform to BS415



Capacity	Drives without P.S.U.		Drives with P.S.U.	
	Single	Twin	Single	Twin
200K (360K)	CLS 200 £89		CS 200 £98	
400K (720K)	CLS400S £82	CLD 400 £168	CS 400S £92	CD400 £188
800K (1.44M)		CLD 800S £162		CD 800S £182

● TWIN Disc Drive Case, complete with Power Supply & Cables **£43**
Securicor carriage on Disc Drives £5 to £6

*Prefix **C** = Cased Drive*
L = Less PSU
S = Single
D = Double

*Suffix **S** = 40-80 Switchable*

e.g. CLS400S = Cased Disc Drive, Less power supply unit, single 5¼" 400K, (720K in double density); Double sided; 40/80 track switchable.

Cable to connect 5¼" Disc Drives to BBC Compact
Single £9 Twin £12
Special Cable to connect both 3½" and 5¼" Disc Drives simultaneously to the BBC Compact £13

3M – DISKETTES

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electronics your 3M Appointed Distributor.

● *10 × 5¼" S/S D/D 40 Track Diskettes (744)*	***£6.00***
● *10 × 5¼" D/S D/D 40 Track Diskettes (745)*	***£7.50***
● *10 × 5¼" S/S D/D 80 Track Diskettes (746)*	***£11.50***
● *10 × 5¼" D/S D/D 80 Track Diskettes (747)*	***£11.00***
● *10 × 5¼" 1.6M D/S D/D High Density Discs for IBM XT and AT*	***£19***
● *10 × 3½" S/S D/D 40/80 track Discs*	***£10.00***
● *10 × 3½" D/S D/D 40/80 track Discs*	***£11.75***
● *10 × 3½" High Density Diskettes*	***£37***

TOP QUALITY 3½" & 5¼" DISKETTES

To complement our range of Quality Discs and Disc Drives, WE are now supplying SPECIAL OFFER packs of 10 Lifetime guaranteed discs. Each disc has a reinforced hub ring. Supplied complete with selfstick labels and a Plastic Library Disc Box.

● *10 × **M3** 3½" D/S D/D 80 Track Discs*	***£11***
● *10 × **M9** 3½" Double Side High Density*	***£34***
● *10 × **M4** 5¼" S/S D/D 40 Track Discs*	***£5***
● *10 × **M5** 5¼" D/S D/D 40 Track Discs*	***£7***
● *10 × **M7** 5¼" D/S D/D 80 Track Discs*	***£9***
● **10 × M8 5¼" D/S H/D Hi-Density Discs**	**£14**
● *3" Double Sided Discs*	***£3** each*

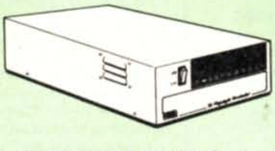
PRICES SLASHED

Special BULK OFFER on 5¼" DISCS

(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)

BULK PACK DISCS in lots of 100

Type	S-S 40T	D-S 40T	D-S 80T
● Without Sleeves	£35	£39	£45
● With Sleeves	£38	£42	£48



WATFORD's WINCHESTER DRIVES

Undoubtedly the best value for money Winchester Hard disc available anywhere for the BBC Micro.

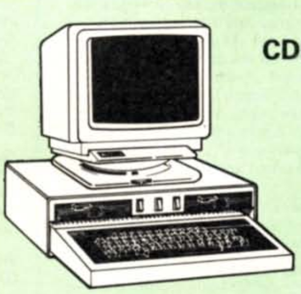
This 30 Megabyte hard disc is completely compatible with the Acorn ADFS – that's why we have bundled it with each Winchester drive, along with a full user guide and full utilities including file copy, 1000K save routines, Format and Verify – in fact all you need and more.

Finished in rugged metal and fetching BBC beige, the Winchester has an internal fan, so quiet you won't even hear it! A switched mode power supply and a neon-lit on/off switch are there along with a light on the hard disc to tell you when it is working – just compare the price with our competitors' 20 or 28 Mbyte discs!

Compatible with the Master, and the BBc B (with 17 X disc interface).

● 10 Megabyte **£350;** ● 30 Megabyte **£420**

CDP800S **CDPM800S**



Twin 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC Micro. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

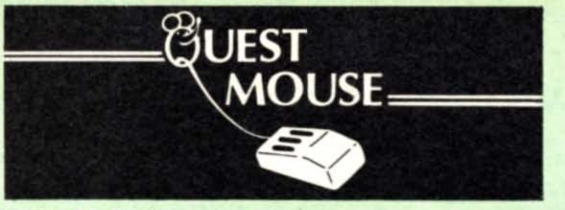
CDP 800S for BBC Micro £192
CDPM 800S for Master £196
DP35-800 for BBC/Master £165
(For DP35-800S spec. see Page 9 of our advert)

(Securicor Carr. £7)

(The above drive units are 2 Megabytes unformatted)

Continued ⟶

NOMINATED FOR
MICRO
BRITISH COMPUTING AWARDS
1987



QUEST MOUSE

The ultimate in Mouse technology, the Watford Electronics Quest Mouse must be the most powerful Mouse package yet produced for the BBC Micro. Featuring state of the art 32K ROM software the Quest Mouse package is filled with features essential to the budding artist. The Quest Mouse is a high precision, low profile and large footprint mouse. It has three large comfortable buttons and its RUBBER COATED STEEL BALL is smooth and easy to use on virtually any work surface. This also eliminates any directional bias that one encounters on the most well-known mouse for the BBC. The Quest Mouse is FULLY HARDWARE COMPATIBLE with the AMX MOUSE so that it will work with any of the AMX range of software.

The two parts of the Quest package are available separately so that existing Mouse owners can upgrade to the Watford's sophisticated Quest Paint software or replace their existing worn out mice for a minimum cost.

QUEST PAINT

The Quest Mouse software is supplied on a PALPROM unit to allow the sophisticated 32K program to be used from a single ROM socket. It is compatible with the BBC B, BBC B Plus and BBC Master Series machines.

The software is used to draw high resolution Mode 1 pictures in full colour. All menu selection and control of the drawing process is performed with the mouse so that you will hardly ever touch the keyboard.

SOFTWARE FEATURES

The software is far too powerful for us to describe it fully in such a small space. Below is a list of the various features. Please write to us for a fully descriptive leaflet.

Disk interface not required. Utilities disk has facility to create and print big screens. Colours applied can be solid, either pattern of user defined pattern. Drawing can use brush or airbrush. Brush shapes can be defined and stored. Airbrush sprays colour/pattern randomly with four jet sizes and even or center spread. Colour cycles. Colour protection to stop particular colours from being overwritten by selected drawing actions. All standard drawing facilities like: rubber, straight pencil lines, triangles, circles, ellipses, rectangles, parallelograms, polygons, etc are provided. All shapes can be solid or just a boundary line. Once a shape has been set up it can be repeated anywhere on the screen. Global colour replace in a rectangle. Powerful fill facility for areas and vertical/horizontal lines. Full cut and paste of rectangular areas with rotation and size with screens from Watford Beeb Video digitiser. Load and Save screens with colour pallet information, save brush and pattern definitions etc.

Take The Guesswork Out of Selecting a Mouse Package
With reviews like this how can you go wrong.

Popular Computing Weekly, 9-11 June '87
"What you actually get for your money is a well built, three button mouse (far superior to the AMX mouse)."
"Overall the combination of a quality mouse and decent art package gives Watford Electronics a real chance of supplanting AMX as mouse supremos."

Micro User June '87
"Quest Mouse and Quest Paint can hold their heads high in the market. . ."

A&B Computing June '87
". . . Watford Electronics, a company famed for excellent hardware add ons and versatile software packages. Called Quest mouse, "this is a very special mouse driven drawing package..." ". . . you will have one of the most comfortable and professionally built mice I have used in a long time. The buttons are responsive, the mouse movement is smooth and without directional bias – a pleasure to use."

"What we have here is probably the best art package there is for the BBC Micro . . ."
"Quest Paint is a major leap forward in BBC programming. . ."
"Quest Paint is an original piece of programming, it is friendly and well endowed with many useful facilities. I would comfortably say it is easier to draw good pictures with Quest Paint than it is with more expensive 'Professional' art packages for the Atari ST and the Commodore Amiga. A recommended buy if you are looking for the best in BBC micro based art packages".

Acorn User, September '87
"The mouse (Quest) performs well in the face of competition from AMX, Wigmore and the rest . . ."
". . . this package represents excellent value for money. If you are interested in art then this program is for you to buy".
"Given time, I can see no reason why Quest Paint shouldn't take on the title of the definitive art package available for the BBC Micro to date".
"All in all, Quest Paint is a very professional package. It contains virtually every feature the budding artist could require".
"What makes Quest Paint so versatile is the addition of a sub-menu which allows you extensive control over each function".
"Until recently, Superart from AMS had been judged as the definitive mode 1 graphics package for the BBC micro. But now it has a serious rival in the form of Quest Paint, from Watford".
"As a measure of what is contained within Quest Paint, I would say it had all the features of Superart plus . . ."
"In most art packages, provision is given for drawing triangles and rectangles. Quest Mouse goes 14 better, allowing any regular polygon of upto 16 sides".
"One facility, not found on any other Art package to my knowledge, is the ability to access a digitiser from within the program". The reviewer concludes by saying, "The result is an extremely comprehensive and professional art package".

John Kilby, Head of Computer Science, Bishop Wulstan High School, Rugby, writes:
"Quest has been an excellent piece of equipment. The problem that seems to occur everyday is that at lunchtime the pupils rush to the computer room to make sure that they are first in the queue for the 'Quest' mouse".

Lt. Col. C.G. Holton, HQ 1 (BR) Corps, BFPO 39, writes:
"As ever your service is superb and the Quest Mouse proves every bit as good as the adverts claim".

Beeblet User Group, New Zealand Oct '87:
"One of its nicer features is that the top menu is done in Mode 0, the drawing itself is in Mode 1. Thus on screen together are two different Modes. A neat way around an old problem".

"PAN is used when a larger than one screen size image is required. The mind boggles at an A3 size drawing".

"I like it partly because of the mouse itself which is smooth and easy to handle but mainly I suppose because of the features I longed for and previously never got. Its easy to use with almost everything at your fingertips from the mouse. The software is simple where needed and complex where complexity is required".

ConQuest

Watford's Quest package is an extremely powerful and flexible drawing package, with very wide and unusual features. However, since its launch various suggestions for even more advanced & powerful facilities were received from the Quest users. ConQuest allows you these more advanced facilities, like, distortion of a cutout to any shape and a full font designer. If you also have a GXR ROM in your machine or you are using a BBC Master then ConQuest will take advantage of this to give ellipses at any angle, sectors and arcs, etc. Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.
Some of the features are:

- *Pick filenames off the screen for loading and saving.*
- *Rotate a cutout to any angle and Distort it to any four sided shape.*
- *Has Built in Font editor.*
- *Default brushes and patterns on startup.*
- *16 x 16 font available on start up.*
- *Ability to reset patterns, fonts and brushes to default at any time.*
- *ROM based enhanced Epson and compatible printer dump.*
- *ROM based enhanced extended picture routine.*
- *Ability to create and abort extended pictures.*
- *Improved disk access speed for extended pictures.*
- *User definable sideways RAM driver for incompatible sideways RAM systems.*
- *Ellipses at any angle on Master 128 (or B with GXR ROM).*

QUEST MOUSE & QUEST PAINT	***£49***
QUEST MOUSE, QUEST PAINT, AMX PAGEMAKER & PAGEFONT	***£82***
QUEST MOUSE ONLY	***£25***
QUEST PAINT SOFTWARE	***£32***
QUEST FONT DISC	***£12***
ConQuest 32K ROM Package	***£29***
QUEST MAT	***£3***
Part-exchange your old Mouse for a New QUEST MOUSE for only	***£23***
GXR ROM for BBC Micro	***£22***

N.B.
1. Quest Paint supplied complete with Software in a 32K ROM, Comprehensive User Guide and a Utility Disc.
2. Quest Font Disc has 22 text FONTS for use within Quest Mouse.

MARK II LIGHT PEN

Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted.

Price Only £21
(Price includes FREE software Disc and Operating Manual)

RB2 Marconi Tracker Ball

RB2 (AMX/Quest compatible)	£49
RB2 including Quest Paint	£78

FLEET STREET EDITOR

Software pack for BBC Micro	£33
Software pack for the Master	£39
Software Pack for Compact	£40
Admin Xtra Disc Utility	£13
Walt Disney Disc Utility	£13
Fonts N Graphics Disc Utility	£13

THE NEW Mk III AMX MOUSE

ONLY: £59 **Inc. Super Art package**
(carr £1.50)
(Please specify for BBC, Master or Compact)

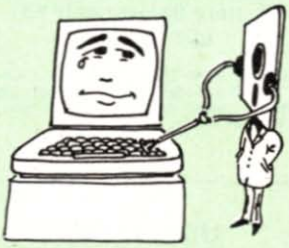
FREE our popular Colour Art software pack worth £15 with every AMX Mouse package purchased from us.

MOUSE MAT	£3
AMX MOUSE ONLY	£29
AMX UTILITY Package	£11
AMX SUPERART Package	£34
AMX STOP PRESS – A Desktop publising software. Works with Keyboard, Joystick or a mouse	£32

We are giving away absolutely FREE, our PAGE-FONT disc with every purchase of STOP PRESS from us.

PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker	£12
AMX DESIGN (ROM)	£55
AMX 3D ZICON Disc	£19
AMX XAM Educational	£15
AMX EXTRA EXTRA	£16
AMX MAX A gem of desktop (ROM)	£15

DIAGNOSTICS DISC



The BBC Micro is a very complex machine and thus diagnosing a fault can be very difficult.
At Watford Electronics, we realise how difficult it can be when faced with a problem, finding yourself a long way from your nearest dealer, or even just uncertain about your Beeb's health, but not wanting to waste time and money taking it to be looked at.
The solution to these problems is here now, in the form of the Watford's Diagnostics Disc. This excellent utility is specially designed to test out the following areas of your Beeb:
RAMs, ROMs, ULAs, Sound, Keyboard, Disc, RS423, ADC, User Port, Printer Port, Cassette, Joysticks, Speech, Disc Drives, 6502 and Z80 2nd Processors.
This utility is an invaluable aid for all those who take the reliability of their system seriously. A comprehensive manual provides full operating details and a list of possible causes and remedies for any faults that you may find along the way. The package also enables a permanent equipment and service record to be maintained.

Only £20.00

BEEB VIDEO DIGITISER

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro.

This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket.

Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem.

The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

Both the black and white levels can be adjusted manually for the optimum picture, or switched to automatic for unattended use. The image produced can be reversed if necessary.

Full controlling software is supplied on a normal sideways ROM and this is easily accessed via additional * commands. The package i designed to allow easy input of complex screens and give full access of the data to the user. Once on the screen, the image can be used as a normal graphics screen, allowing any of the usual graphics commands in BASIC or other ROMs to work on it.

A special print dump routine is included with the driver programs. This is specially designed to produce a fast, correctly proportioned picture, with reduced "contouring", resulting in an accurate reproduction of the original image.

Detailed examples of driving this unit from BASIC or other languages are all provided in the extensive manual supplied.

£109 (Carr. £3)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)
(BBC B+ and Master compatible, except Master with Econet)

Magazine Maker

(As seen on TV)

A combination of the Pagemaker and Watford's Beeb Video Digitiser.

Using any video that provides a composite signal and the digitiser, images from a camera or TV can be converted into a graphics screen on the BBC Micro.

They can then be used within Pagemaker to illustrate magazines or newsletters – in fact anything that needs to be created on A4 size paper.

With Pagemaker's many features, a variety of pictures can be composed – the only limit being the imagination.

Pictures can be doctored using Pagemaker's graphics option to produce any number of effects.

Text can be formatted around the digitised photo on screen using the facilities available, which include 16 typefaces, character and pattern definer, text formatting and the ability to load in wordwise and viewfiles plus much more.

Once created the picture can be printed out.

The Magazine Maker is suitable for any use that requires illustrated documents.

Complete Package **£135.00** (carr. £3)

OFFICE MASTER

CASHBOOK – A complete "Stand Alone" accounting software package for the cash based sole trader/partnership business. It is designed to replace your existing cashbook system and will provide you with a computerised system complete to trail balance.

FINAL ACCOUNTS – Will take data prepared by the Cashbook module and produce a complete set of accounts as following: Trial Balance with inbuilt rounding routine; Notes to the accounts; VAT Summary; Profit & Loss A/C; Balance Sheet.

MAILIST – A very versatile program. Enables you to keep records of names and addresses and then print, examine, sort and find them, all with special selection techniques.

EASILEDGER – A management aid software tool designed to run alongside an existing accounting system. Essentially a Debit/Credit ledger system which can handle sales, purchase and nominal ledger routines to provide instant management information.

INVOICES & STATEMENTS – Greatly reduces the time and cost of preparing Invoices and Statements by storing essential information like customer names, addresses and account numbers. Has VAT routines and footer messages facility.

STOCK CONTROL – Allows you to enter stock received, stock out, summary of stock items and current holdings together with details of total cost, total stock to minimum level, units in stock ordering, quantity and supplier detail.

All this for only **£21** (Disc)

OFFICE MATE

- DATABASE
- BEEBCALC SPREADSHEET
- BEEBPLOT GRAPHICS

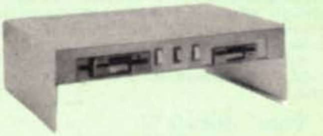
DATABASE – Set up a computerised card index system with powerful search facilities.

SPREADSHEET – Offers many calculation and editing features.

BEEBPLOT – Provides visual representation from Spreadsheet data.

OFFICE MATE Only £10 (Disc)

Disc Drives DP35-800S



A Double disc drive – with a difference! Times are changing fast for the floppy disk, and whilst the current standard for the BBC B and Master Series is the 5.25 inch disk, the standard for the future will most certainly be the smaller; faster and more reliable 3.5 inch disks – now a standard feature of both the Master Compact and the Archimedes Series.

To support the present disc drive users, and cope with the future, we have designed our own plinth-mounted disk system – called the DP35 800S, it contains both the 5.25 inch and the 3.5 inch drive formats as well as offer a firm and rigid support for a monitor on top. With the BBC Micro underneath, the plinth makes a surprisingly small footprint on the desk – leaving you more space to work with.

The 5.25" disc drive is 40/80 track switchable. For ease of access, the switches are front mounted. DP35-800S has its own power supply, independent of the BBC Micro.

Watford's new plinth enables users to read, write and format disks both in DFS and ADFS format – currently the accepted standard for the Master Compact and the Archimedes, it also enables the user to read disks written for the Archimedes. Ideal for both BBC & Master.

Launch Offer: **£165** (carr. £7)

Continued →

ARIES CORNER

B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Comal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved *FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on your BBC micro – no flying leads to connect and no soldering. Provision of the on-board ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Price: **£80** (carr. £2)

Aries B-12 Sideways ROM Board

This board is extremely well made, simple to install, reliable when fully loaded and compatible with the Aries-B20 and the Aries-B32

The B12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

The B12 system consists of two parts: a large detachable "mother board" which carries the extension ROM sockets and a small "base board" on a short ribbon cable, which plugs into the existing sideways ROM sockets. This two-board design eliminates the reliability problems previously associated with some other ribbon-cable based systems.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal cost.

Price:	Aries B-12	**£40**
	Aries B-12C	**£5**

ARIES B-488 IEEE-488 INTERFACE UNIT

The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB' or 'HP-IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

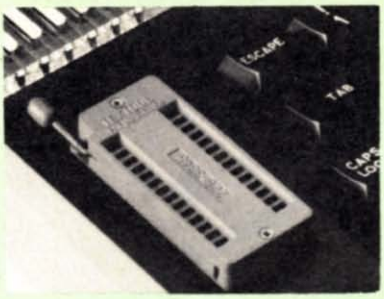
£238 (Carr £3)

EXTERNAL ROM BOARD for BBC MASTER

This external Beige finished, free standing cased unit with its own Power Supply allows you to plug-in upto 12 ROMs and 16K Sideways RAM.

Only £78

SIDEWAYS ZIF SOCKET



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.

- The low profile of the socket allows unrestricted access to the Keyboard.

- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.

- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for all professionals and Hobbyists alike.)

- BBC, B+ and Master compatible.

ONLY **£16** (carr £2)

Low Profile CARTRIDGE SYSTEM

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack for the BBC B.

● Complete System	**£11**
● Spare Cartridges	**£2.50**
● Spare Rack	**£1.50**

ROM Cartridges for the BBC Master
Twin **£8;** Quad **£12**

16K DISC RAM

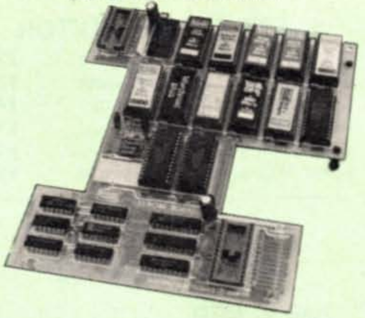
Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.
Key points to note about this new addition to the Watford range of products are:

- Write protection (useful in a variety of circumstances).
- Read protection (allows recovery from ROM crashes).
- Compact construction.
- Supplied complete with Battery Backup.
- Multiple units may be fitted, even with a ROM board.
- No overheating or overloading problems.
- Free utilities disc supplied.
- Can be used as a 16K PRINTER BUFFER.
- Ideal for professional software development.
- Supplied with utilities software disc.

Only: **£35** (carr £2)

P.S. 16K Disc Ram Board is not designed to work in conjunction with a Sideways ROM Board.

SOLDERLESS SIDEWAYS ROM SOCKET BOARD



In the May 1986 Micro User's independent review, the writer concludes, "The board has been well laid out. Its position is much better than others – not over the HOT RAM chips and further away from the disc controller area". "I give the solderless ROM board the thumbs up and wish it success"

This brand new board from Watford Electronics is designed specifically for those wishing to add a ROM board to their own BBC without the need to perform any soldering.

This new board expands the total possible number of ROMs in a BBC from 4 to 16.

Unlike our competitors inferior boards, the ONLY upgrade required for fitting battery backup to the Watford Solderless ROM board (all Watford ROM boards, actually) is the fitting of the battery itself. (No other expensive components are required.)

- The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:
- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £32
Battery backup fitted **£36**
Battery Backup only **£3**
(carriage £2)

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

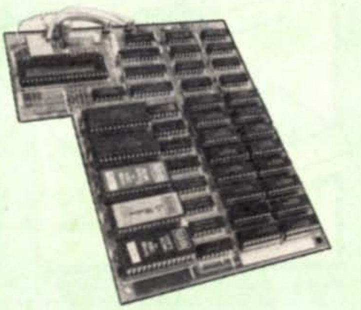
USER PORT SPLITTER UNIT

User Port Splitter
A
B

Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaniously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination.

Excellent Value at **£22** (carr £2)

ROM/RAM CARD



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 3 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO overheating problems.
- No User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Firm mounting in BBC micro.
- Compatible with all BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of Battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- Accepts any ROM.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE Fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROM-SPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

Please write in for further details.

INTRODUCTORY PRICES:

● ROM/RAM card with 32k dynamic RAM	***£48***
● ROM/RAM card with 64k dynamic RAM	***£65***
● ROM/RAM card with a massive 128k dynamic RAM	**£109**

(carriage on ROM-RAM Card £3)

OPTIONAL EXTRAS:

● 16k plug-in Static RAM kit	**£17**
● 16k Dynamic RAM for Upgrade	**£17.50**
● Battery backup	**£3**
● Read and Write protect switches	**£2** each
Complete ROM-RAM board All options installed	**£115**

P.S.

Is your existing ROM Board overflowing with ROMs? Do you need more Sideways RAM? Is your Board unreliable? Then upgrade to Watford ROM/RAM Board and pay £5 less

Le Modem

The MODEM from Watford

At last a professional MODEM for the BBC Micro. Unlike other 'Modem packages' this is a complete package there are no extra software costs to get 'up and running'. Of course Le MODEM is multi-standard, i.e. 300/300, 1200/75 & 75/1200 UK and BELL (USA) are all supported.

The features that make Le MODEM such good value are:

- *A complete communications terminal that transforms your BBC Micro into a very powerful World-wide data transfer system.*
- *Auto Dials, Auto answers, and is completely controlled by your micro. There are no external controls!*
- *Allows you to access PRESTEL, B.T. GOLD, THE SOURCE, MICROLINK, MICRONET, MICROWEB, THE TIMES NETWORK, MICRO LIVE (BBC TV database), CITY BB and more.*
- *Designed to be SIMPLE but SOPHISTICATED. To LOGON to a data base all you have to know is its TELEPHONE NUMBER, Le MODEM does the rest.*
- *Supplied with a comprehensive telecomms package in a 16K sideways ROM which includes a FULL PRESTEL terminal allowing TELE-SOFTWARE to be downloaded.*
- *A comprehensive 80 column terminal. This includes XMODEM error checked transfer protocol, to allow error free data transfer anywhere in the world!*
- *FULLY controlled by simple "*COMMANDS allowing you to control it from your own BASIC programs. To get you started we supply a FREE disc of bundled software!*
- *Connects to the 1MHz bus. A *AUDIO ON-OFF command allows you to actually hear the telephone line through your BBC micro loudspeaker.*
- *Completely self contained with internal mains power supply. (Even a free mains plug is fitted!) A *TEST facility gives ON SCREEN indication that Le MODEM is working correctly.*
- *Packaged in such as way that you need nothing else except a BBC Micro to communicate with computers all over the world.*
- ***FREE Registration to MicroLink.***

SPECIAL OFFER

Price: ***£75***
(carr £3)

(Price includes, Le Modem, Software ROM, Cables & Comprehensive Manual)
(Write in for further details)

REPLICA 3

This new improved REPLICA 3 from Clares is a very powerful disc based TAPE to DISC Utility. It now transfers even more programs than ever before. Replica 3 will not work with all programs but then neither will anything else. 30,000 Replicas have been sold to date. It has to be good.

£15 (40 or 80 track)

Acorn's Speech Synthesiser package, complete
Special Offer £18

APOLLO

The NEW Modem from Watford

Following numerous requests from you, our discerning customers for an APPROVED, Low Cost & High Performance modem with Auto Dial & Auto Answer facilities as standard) we bring you the versatile APOLLO Modem. Just compare the features and look at the price (which incidentally includes the cost of the Software, manual and BBC connecting cable). We are sure you will agree that Watford Electronics in their traditional way are giving you a super 'value for money' deal.

Just look at these features:

- V21 for Bulletin boards, Microlink, Telecom Gold, etc.
- V23 for Prestel, Home Banking, and other Viewdata services.
- Reverse V23 allows User run Viewdata service.
- 1200-1200 half duplex for communications.
- XMODEM, HEX and ASCII file transmission.
- Auto Dial of given 'phone number.
- Auto Answer for User's Bulletin Board.
- 80 column terminal with split screen facility.
- Prestel text screen dump.
- Fully BABT approved.
- **FREE Registration to MicroLink.**

The Apollo is attractively finished in matt black. It opens the doors to world communication to both, the Hobbyist and the Professionals alike. With baud rates varying from 300/300 Originate and Answer, 1200/75 and 75/1200 full duplex and 1200/1200 half duplex, virtually all the popular tele-services can be accessed. A comprehensive Comms ROM oversees the use of the APOLLO, providing simple commands for all the software controlled facilities. APOLLO is an ideal modem for both the first time buyer and the seasoned user. Join the Telecommunications Revolution – Buy a Watford APOLLO!

Only: **£82** **(Carr £3)**

Price includes, the Modem, Comm Software Cables & Operating Manual).
(Write in for full specification)

VOLTMACE JOYSTICKS

Delta 3B Single Joystick	**£10**
Delta 3B Twin Joysticks	**£15**
Delta 3C Joystick for Compact	**£10**
Delta 14B Single Joystick	**£11**
Delta 14B/1 Adaptor Module	**£12**
Transfer Software Disc-Tape	**£7**

ATTACHE CARRYING CASE

For the BBC Micro. Attractively finished in antique brown leatherette. Lockable.
Only **£10** (£2 carr.)

Versatile **BEEB SPEECH SYNTHESISER** Unit

The Watford Speech Synthesiser is a very flexible speech synthesis unit based upon the powerful phonemes system. This system stores the building blocks of speech (called phonemes) and allows you to combine them quickly and easily to form virtually any word imaginable.

Supplied with an advanced ROM, you are provided with a 500 word dictionary to get you started. These can easily be added to by following the notes given in the comprehensive manual.

SPECIAL PRICE £32 (carr £2)

Continued ⟶

COMPUTER CONCEPT'S ROMS

ACCELERATOR	£46
CARETAKER Basic Utility	£23
DISC DOCTOR	£28
Graphics ROM	£29
TERMI	£25
COMMUNICATOR	£49
SPEECH SYSTEM	£35
Printmaster	£25

Wordwise £23

Wordwise plus £40

We are giving away absolutely **FREE,** the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear text-segment area.
- BBC B, B+ and Master compatible.

Only **£24**

(N.B. Word Aid requires a Disc Interface in your Micro)

HI-WORDWISE-PLUS DISC: £5

SPELL MASTER £42

Inter SHEET ONLY £37

INTER CHART ONLY: £25

Inter-WORD £36

MEGA-3 ROM

Interword, Intersheet & Interchart – 3 in one ROM £76

INTERBASE £49

All Prices Exclusive of VAT

VIEW

VIEW WORDPROCESSOR 2.1	£35
VIEW 3.0 ROM	£48
VIEW PROFESSIONAL	£59
HI-VIEW (for 6502 2nd Processor)	£36
VIEWSHEET (Acornsoft)	£36
VIEWSTORE	£36
VIEWSPELL with 80 track disc	£29
VIEWPLOT Disc	£20

(Please specify for Master 128 or Compact)

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

VIEW-INDEX	£12
OVERVIEW Packs 1 & 2	£69

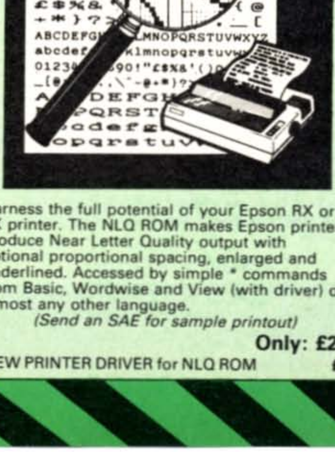
Watford's own Sophisticated VIEW PRINTER DRIVERS

Epson FX80 & Kaga KP (Disc)	£8
Juki & Brother HR15 (Disc)	£8
Silver Reed Printers (Disc)	£8

MINI OFFICE II

DISC Version for BBC B & B+	£14.00
DISC Version for BBC Master	£16.50
ROM Version	£43.00

(When ordering please specify for which Micro & 40 or 80 track Disc).



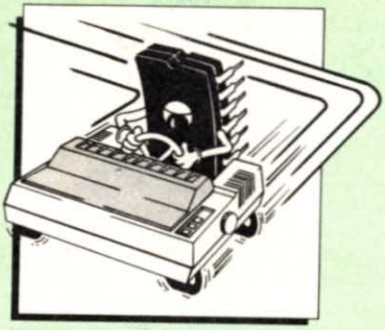
Harness the full potential of your Epson RX or FX printer. The NLQ ROM makes Epson printers produce Near Letter Quality output with optional proportional spacing, enlarged and underlined. Accessed by simple * commands from Basic, Wordwise and View (with driver) or almost any other language.

(Send an SAE for sample printout)

Only: £25

VIEW PRINTER DRIVER for NLQ ROM £7

VIEW PRINTER DRIVER ROM



View is a powerful word processor, but until now has seriously lacked in terms of printer support. With the launch of our Printer Driver ROM, which includes an extremely powerful and easy to use Printer Driver Generator, View users can find themselves in the realms of advanced word processing only at a small outlay.

The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, Panasonic KX-P1081/2, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redefinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute * command when printing.

Other features include a very powerful on screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips. (Write in for a detailed leaflet).

Price: Only £33

ROM-SPELL

ROMSPELL
ENGLISH DICTIONARY

Probably the most advanced and fastest spelling checker available for the BBC Micro. Compatible with View, Wordwise and Wordwise Plus ROMSPELL is simple to use with easy editing of incorrect words. Full facilities for editing the user dictionary to allow customisation to your personal needs. Dictionary includes over 30,000 words and is supplied with a Comprehensive manual.

NOT compatible with 1770 DFS.
(Please state 40 or 80 track disc)

Price still only: £25

DUMPOUT 3

A highly sophisticated screen dump ROM. This has to be the most flexible and powerful screen dump ROM yet produced for the BBC micro. It will put on paper anything you see on the screen, including full Mode 7 graphics.
Also provided are window setting utilities and OSWORD calls to plot and read Mode 7 graphics pixels.

Facilities:

- Vertical and horizontal scaling in all graphics modes and mode 7
- Rotation of image by 90, 180 or 270 degrees
- Left hand margin setting
- Screen dump window setting
- Colours appear as grey scale
- Two tone fast dump
- Colour mask
- Mode 7 contrast expansion
- Mode 7 contiguous dump
- Key triggered and User Port triggered dumps

The Micro User Feb. 1985.
'Without reservation I wholeheartedly recommend the Dump Out 3 ROM as the ultimate screen dump facility for the BBC Micro . . . it must represent excellent value for money and surely cannot be beaten".

For use with the following printers:

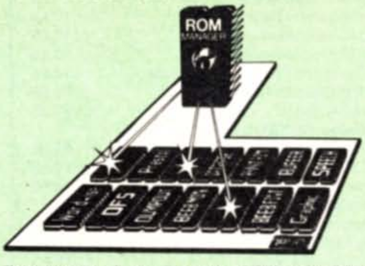
GLP, GP80/100/250, CANNON, STAR, KAGA/TAXAN, NEC, SHINWA CP80, GEMINI, EPSON MX/RX/FX, M1009, NEC PC8023, DMP100/200/400, Panasonic KX1081/82, Mannesman Tally and compatibles.

Only: £25

BBC SOFTWARE'S
Popular Educational Software

● Maths with a Story 1 (Disc). 4 primary level maths programs	£11.25
● Maths with a Story 2 (Disc) 4 further maths programs	£11.25
● Picture Craft (Disc) 6 - 14 age group. Pack consists of flexible geometrical design & colouring programs	£17
● WAVES: Science Topics (Disc) CSC O Level Physics program.	£14.95
● RELATIONSHIP: Science (Disc) O Level Biology program.	£20.00
● BONDING: Science (Disc) O Level Chemistry program.	£20.00
● ELECTROMAGNETIC SPECTRUM (8 Discs) O Level program.	£20.00
● ELECTRONICS IN ACTION (Disc) O Level program	£19.95
● NEWTON & THE SPACE SHUTTLE (Disc) O Level program.	£20
● ECOLOGY (Disc) O Level program.	£20
● POLYMERS (Disc) O Level program.	£20
● Clasification & Periodic Table O Level. The suite is supplied with its own database of chemical elements which can be classified according to your own rule.	£20
● FOOD & POPULATION (Disc) O Level program.	£20
● MICROTECHNOLOGY (Cassette) O Level program.	£11.25
● A VOUS LA FRANCE (2 Cassettes) A French language home study aid.	£21.70
● DEUTSCH DIREKT! (Disc & Audio Cassette)	£19.95
● Modem Master (Disc)	£11.25
● ADVANCED TELETEXT SYSTEM	£8.65
● PERIOD TABLE SOFTWARE	£20
● Astronomy – Primary (Disc)	£12
● Computers at Work – Primary	£17.35
● Introducing Geography – Primary	£17
● **Introducing Geography 11-17yrs**	£17.50
● Electric Fields 6-14 years	£11.25
● BlackQueen Contract Bridge	£13
● Espana Viva – 3 Discs	£19.95
● A Vous La France Disc	£21.50

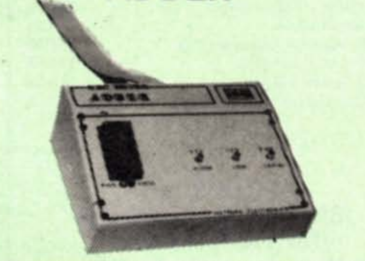
ROM MANAGER



Take control of your Sideways ROMs with ROM Manager. This powerful utility ROM gives you power over your sideways ROMs. Disable whole ROMs, send commands directly to named ROMs and many other powerful facilities.
"Provides comprehensive management of all your installed ROMs". (BEEBUG November '84.)

ONLY £20

ADDER



The only low cost EPROM Programmer for the BBC Micro that will program both the standard 21V and the new 12V5, 27128 EPROMS.
Adder is the ultimate EPROM programmer for the BBC Micro. It will program many different EPROMs up to the very latest 27256 32K devices.
The Adder unit connects to the User Port and draws its power from there too. The EPROM is mounted in a top quality ZIF socket. There are no switches or controls as Adder is entirely software controlled.
The Adder software provides sophisticated facilities for programming EPROMs from a RAM image produced by loading disc files. The software is menu driven and designed for ease of use.

Features:

- Two ultra fast programming algorithms or standard slow algorithm.
- Supports standard 21V programming and newer 12.5 volt EPROMs. (Software switched).
- The RAM image to be programmed can be built up in many ways. Sections of image can be loaded separately. Part programming. Read EPROM. Edit data in memory.
- Automatic processing to handle a list of files to program into the EPROM.
- Automatic disc buffering to allow programming of 32K 27256 devices from a 32K file without extra effort.
- Verification gives detailed error list and checksums are maintained. There is also a blank check facility.
- Works with all standard filing systems. Generates header code for RFS ROMs to allow Basic programs etc. to be stored in EPROM. More than one file per ROM permitted.
- Programs the following EPROMs: From 2K to 32K: 2516, 2716, 2532, 2732, 2764, 2764A, 27128, 27128A, 27256 (Both 12.5V and 21V).

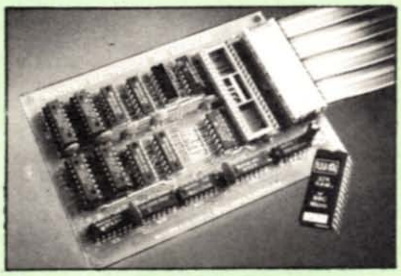
£75 (£3 Carr)

TEX EPROM ERASERS

EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs! The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast. We use these erasers for all our own erasing work.

- **ERASER EB** – Standard version erases up to 16 chips. **£28** (carr £2)
- **ERASER GT** – Deluxe version erases up to 18 chips. Has automatic safety cut-off to switch off the UV lamp when opened. **£30** (carr £2)
- Spare UV tubes. **£9**

32K
SHADOW RAM-
Printer Buffer
Expansion Board



A MUST FOR WORD PROCESSING

Watford Electronics now brings you the latest state-of-the-art MEMORY EXPANSION BOARD for your BBC microcomputer. Don't throw away your BBC B for a BBC B Plus or BBC Master. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16K or even 20K, but a massive 32K of extra RAM!!!

- IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer – type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.

- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28,000 bytes free – 5 times as much as normal.

- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24K of text in memory. This product is recommended as an ideal complement by Computer Concepts.

- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20K of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28K of program space.

- Use the FULL 32K or the bottom 12K of the expansion RAM as a PRINTER buffer for PARALLEL or SERIAL printers, sound channels, RS423 etc. Print large text files while running long graphics programs, and have all your buffer options available as well (*FX15,21,138,145,ADVAL etc). Please note only a 12K printer buffer can be used with Wordwise or Wordwise-Plus, due to the way they are written.

- Unique facility to turn ROMs off and on again. Unlike all other ROM managers, this feature does not use 'unofficial' memory. Two bytes of normally user-inaccessible memory on the RAM card are used to ensure ROMs are disabled WHERE OTHER ROMS FAIL.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Only £59 (carr £2)

(Price includes a comprehensive manual and the ROM)

INCREDIBLE WORDPROCESSING DEAL

Watford's 32K SHADOW RAM CARD and Computer Concept's INTERWORD Wordprocessor package.

at Only **£89** (carr £2)

Continued →

BOOKS (No VAT on Books)

15 Hr Wordprocessing BBC/View	£5.95
15 Hr Wordprocessing BBC/WW & WW+	£5.95
30 Hour BASIC (BBC Micro)	£9.95
6502 Assembly Language Program	£19.95
6502 Application	£13.95
6502 Development Package	£7.50
6502 Programming the	£16.95
6502 Reference Guide	£10.95
68000 Assembly Language	£15.95
68000 Assembly Language Prog.	£19.95
68000 Assembly Language Techniques	£24.95
68000 Machine Code Programming	£13.00
68000 Microprocessor Handbook	£14.95
68000 Programming the	£22.95
68000 User Guide	£8.95
6809, Programming the	£18.95
Advanced Disc User Guide	£18.95
Advanced Prog. Guide to BBC	£9.95
Adv. Sideways RAM User Guide	£9.95
Advanced User Guide for BBC	£10.95
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Amiga Machine Lang. Guide	£19.95
ARM Assembly Lang. Prog. Manua £12	
Art of Microcomputer Graphics	£16.95
Assembly Language Prog. for the BBC	£9.95
AY-3-8910 Programmable Sound Generator Data Manual	£3
BASIC 2 - User Guide	£2
Basic ROM User Guide	£11.95
BBC - Advanced Graphics with the	£10.95
BBC - Advanced Programming Techniques for	£8.95
BBC - Mastering Assembly Code	£8.95
BBC Micro & the small Business	£5.75
BBC Micro Basic Sound & Graphics	£7.95
BBC Micro - File Handling On	£7.95
BBC Micro Program-in BASIC	£5.95
BBC Micro ROM Book	£10.95
BBC Micro - within the	£13.95
BBC Master 128 for High Flyer	£10.95
BCPL User Guide	£14
BCPL The Language & its Compiler	£8.50
C Big Red Book of	£7.50
C - A Dabhand Guide to	£14.95
'C' Introducing	£9.95
C for Programmers	£9.95
C Programming Lang.	£23.95
COMAL - Introduction to	£9.50
Complete FORTH	£6.95
Computer Graphics & CAD fundamentals	£9.95
Deutsch Direkti (Book only)	£5.95
DNFS Instruction Booklet	£2
Disc Drive Projects for Micros	£6.50
DISC FILING SYSTEM (DFS) Operating Manual for BBC	£6.95
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FORTH - Advanced	£9.95
FORTH - A Text Reference	£19.10
FORTH - Introduction to	£8.95
FORTH on the BBC Micro	£9.95
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LISP Looking At	£11.95
LISP on the BBC Micro	£7.95
LISP the Language of Artificial Intelligence	£13.95
Logo on the BBC Micro	£7.50
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View 3.0 User Guide	£10
View Guide (View 2.1)	£4.50
Viewsheet & Viewstore Dabhand Guide	£12.95
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VIEW Dabhand Guide	£12.95
Viewsheet User Guide	£10
Viewstore User Guide	£10
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Z80 Applications	£15.95
Z80 Assembly Language Prog.	£20.95
Z80 Programming the	£19.95
Z80 Reference Guide	£9.95
Z88 Computing	£9.95

BOOKS for IBM PC & Compatibles (No VAT on Books)

1-2-3 For Business 2nd Edition	£18.45
1-2-3 Command Language	£18.45
1-2-3 Special Edition (QUE) - Using	£21.95
8086/8088 Assembly Language Prog.	£11.95
8086/8088 Programming the	£17.95
Ability - Using	£12.95
Accountancy software in Business - Using	£12.95
Advance C Tech & Application	£19.95
Advanced Tech. in Turbo Pascal	£19.95
Aldus Pagemaker - Using	£18.45
Amstrad Basic 2 Manuals	£12.95
Amstrad Technical Manuals	£19.50
Amstrad PC Programmers Ref Guide	£15.95
Amstrad PC1512-1640 Step by Step - Using	£8.50
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Autocad - using	£18.95
BBC Assembly Ref. Manual - within	£11.95
Business companion on the 1640	£12.95
CP-M Bible	£16.50
CP-M Handbook with MPM	£9.95
CP-M Plus Handbook	£13.95
CP-M Soul of	£16.50
CP-M The software BUS	£8.95
dBase II & III - Understanding	£7.95
dBase II - Working with	£9.95
dBase III - Mastering	£19.95
dBase III Plus	£12.95
dBase III Plus Handbook 2nd Edition	£19.95
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- Disc Filing Systems
- ANFS
- Terminal Emulator & Editor
- View internal format
- Detailed differences between Model B, B+, Master 128K and Compact
- Comprehensive appendix on 65C12 instruction set

At the rear of the manual there are pull out circuit diagrams for the Master 128K.
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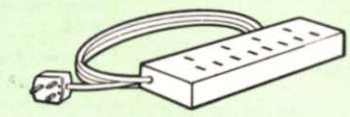

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- GW-BASIC 3.21.
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- 8 expansion slots.
- 102 key keyboard.
- Serial/Parallel Card.
- HDD/FDD Card.
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- GW-BASIC 3.21.
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Caught in a Matrix

Rory McCloy checks out a powerful spreadsheet system

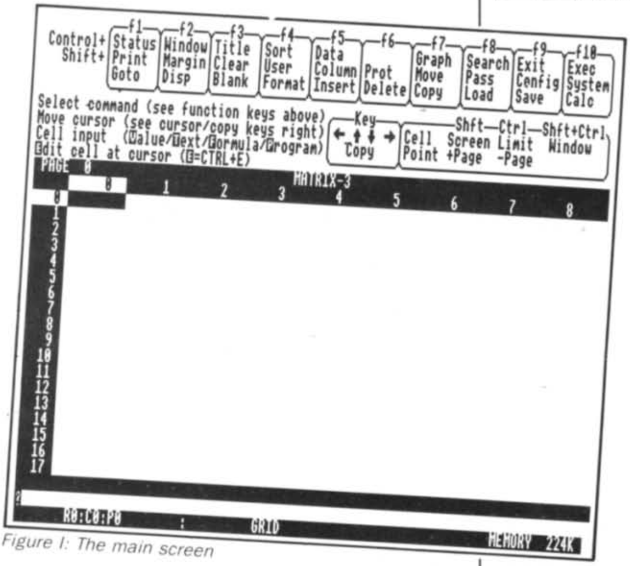
Product: Matrix-3
Price: £95 excl. vat
Supplier: Cambridge Microsystems, 19 Panton Street, Cambridge, CB2 1HL
Tel: 0223 66553

SPENDING a whole day working with a new piece of software and at the end feeling bewitched, bothered and bewildered is very unusual, but such was my experience with Matrix-3. Apart from the cover page of the 192 page manual declaring it to be a scientific spreadsheet and adverts in the micro press announcing a "three dimensional spreadsheet package for the Archimedes", I remain unsure exactly what is on offer and at whom it is aimed.

This may seem an unreasonably harsh opinion but I feel that even specialised software should make some declarations of friendliness.

The professionally produced manual does tell you how to install it on a hard disc and how to run it. Whereupon you are presented with the usual window on to a standard speadsheet with its columns, rows and cells. Matrix-3 allows up to 10,000 rows and 10,000 columns, and this sheet can be subdivided into 100 numbered pages for easier reference. It does not use Wimps or pop-up menus and is keyboard driven.

I didn't like the layout of the screen but the amount of Help instructions available can be TABbed from novice – as in Figure I – to intermediate and expert levels with progressively more of the screen available for the sheet. Fortunately, the default screen colours of yellow text on a blue background can be reconfigured to another combination of screen colours – but only eight.



```
Control+ -f1---- -f2---- -f3--- -f4--- -f5---- -f6---- -f7---- -f8---- -f9---- -f10---
Shift+   Status  Window  Title  Sort   Data            Graph   Search  Exit    Exec
         Print   Margin  Clear  User   Column  Prot    Move    Pass    Config  System
         Goto    Disp    Blank  Format Insert  Delete  Copy    Load    Save    Calc
Select command (see function keys above)    ---Key---   ----Shft---Ctrl---Shft+Ctrl
Move cursor (see cursor/copy keys right)    ← ↑ ↓ →    Cell   Screen Limit  Window
Cell input  (Value/Text/Formula/Program)      Copy      Point  +Page  -Page
Edit cell at cursor (E=CTRL+E)
PAGE 0
                                     MATRIX-3
        0       1       2       3       4       5       6       7       8
 0
 1
 2
 3
 4
 5
 6
 7
 8
 9
10
11
12
13
14
15
16
17

      R0:C0:P0        :         GRID                              MEMORY  224K
```

Figure I: The main screen

A variable number of cells can be frozen as a margin to the scrolling part of the sheet, which aids comparison between different parts of the sheet. Alternatively, the screen can be split horizontally or vertically into separate windows on the same sheet and you can work on either.

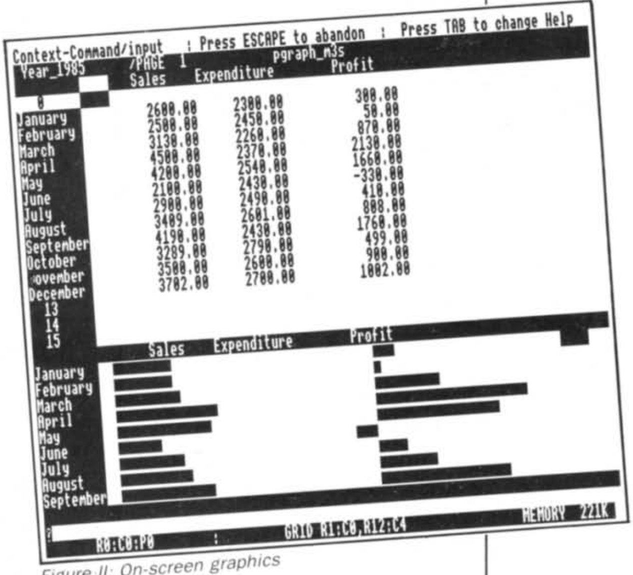
Matrix-3 has all the features you would expect from any spreadsheet with the ability to enter text, values or formulae. However, each cell in a sheet may also contain a multi-line formula or program. This adds a tremendous potentiality to the calculating power of the spreadsheet and numeric constants, string constants, cell references, cell pointers and variables can all be used as data in these cell programs.

Although examples are provided in the manual, they are not accompanied by sufficient explanatory text. The manual devotes the same space explaining how to move the cursor round the sheet with the cursor keys as it does to some complex program explanation.

A cell could contain a program to calculate factorials and place the answer in other cells or calculate the repayment necessary to redeem a mortgage over a fixed period. A PROMPT command, which asks for an entry from the keyboard, can allow cells or cell programs to create live interaction with the spreadsheet, such as "enter surname" or "enter loan term in years".

There are cell functions for all the usual arithmetic, trigonometric and logic operations. The statistical functions include average, sum, mean deviation, standard deviation, variance,

Turn to Page 108 ▶



```
Context-Command/input   : Press ESCAPE to abandon  :  Press TAB to change Help
Year_1985      /PAGE  1            pgraph_m3s
              Sales     Expenditure          Profit
 0                                           300.00
January      2600.00     2300.00              50.00
February     2500.00     2450.00             870.00
March        3130.00     2260.00            2130.00
April        4500.00     2370.00            1660.00
May          4200.00     2540.00            -330.00
June         2100.00     2430.00             410.00
July         2900.00     2490.00             808.00
August       3409.00     2601.00            1760.00
September    4190.00     2430.00             499.00
October      3289.00     2790.00             900.00
 ovember     3500.00     2600.00            1002.00
December     3702.00     2700.00
 13
 14
 15
              Sales     Expenditure          Profit
January
February
March
April
May
June
July
August
September
                                                            MEMORY  221K
      R0:C0:P0        :         GRID R1:C0,R12:C4
```

Figure II: On-screen graphics

◄ *From Page 107*

maximum and minimum values and count of values. I was pleased to find that these functions ignore empty cells.

General cell functions include some more unusual and powerful operators such as TEST – equivalent to IF...THEN...ELSE – CYCLE which is an iteration count and a table LOOKUP. The day, month and year can be used as a numeric or text entry. Matrix functions enable you to add, subtract, multiply, inverse, transpose, multiply by scalar and find the determinant of matrices. And if you can understand these facilities, Matrix-3 may be what you are looking for!

Printing a spreadsheet is dismissed in one page of the manual. This is a pity since I was unable to obtain a satisfactory printout of the sheet. Whichever way I altered the line length in the printer configuration menu I could not obtain a neat tabulated output, and printer highlights do not seem to be supported.

Considering that Matrix-3 is tailored to the Archimedes, the graphic facilities which can plot line or point graphs and histograms – 2D only – are pathetic. The labelling of the axes is crude and the numbers for the scales virtually touch the axis lines. There is little control over the final appearance of the graphs, and the techniques for determining scaling are rudimentary.

More than one graph can be plotted on the same axis, but the plots have default patterns of stripes for the histograms and shapes of points on the scattergrams which cannot be altered. The scattergram points, consisting of squares, crosses and triangles on multiple plots, all come out different shapes and sizes when they appear as pixel patterns on the screen and look dreadful.

The plot thickens

Things get even worse when you try to perform a screen dump – Plotmate A3M/A4SM and Epson MX/RX/FX drivers are provided – either online or offline from a saved screen file. Although I have my fix module installed for the bug in the serial port for some reason these dump routines bypass this and I still end up with corrupted pictures.

A degree of graphic representation can be incorporated into the spreadsheet display. Figure II illustrates one of the example files provided on the disc, the screen display being in the expert mode. However, after two more days trying to master Matrix-3 I still have no idea how to achieve this.

All in all Matrix-3 is not the standard of software I would expect for the Archimedes apart from the undoubted power of its mathematical capabilities, which could appeal to specialist users providing they do not want the spreadsheet printed out or represented graphically.

Points for

- **Powerful functions**
- **Cells can contain programs**

Against

- **Unfriendly manual**
- **Lousy graphics**
- **Poor printout facilities**

The bottom line...

Might find a use in a specialised scientific or educational field

DABS PRESS Archimedes Basic Compiler

The fast & powerful way to write instant machine code

The Archimedes Basic Compiler makes writing machine code programs as easy as ABC! Programs can be written and developed in BASIC and once fully tested and working passed through ABC which transforms them into super-fast machine code ready for immediate action. By including just *six* simple REM statements at the start of your program ABC will convert your BASIC programs into fully relocatable modules!

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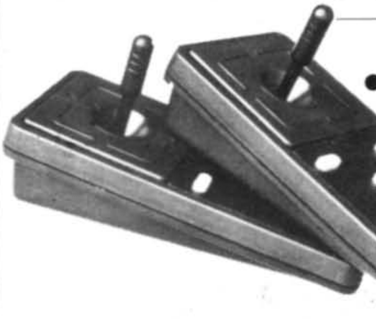

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This state-of-the-art unit, allows programming of 2764, 27128 and 27256 EPROMS both 12.5 and 21 volt. Totally under software control it is believed to be one of the fastest programmers available today.
The comprehensive user-friendly software included in the package has two main parts. The first allows EPROMS to be read, programmed, verified, and edited, also allowing a ROM image to be loaded or saved. The second is a full ROM management system in its own right, which has a host of useful features and routines, such as KILL and RESURRECT ROM to disable or enable a sideways ROM, dump ROM image to buffer or disc, move ROM image in buffer to sideways RAM, and VIEW-SEARCH any sideways ROM.

£30.00

Eprom programmer utility disc – Put all your favourite routines into Sideways Rom, both BASIC and M/Code allows multiple programmes up to 16k with separate * commands for initialisation and help.

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At long last the add-on all MASTER users have been waiting for, an internal ROM board.
No more need to turn the computer off to insert the cartridge containing the ROM you need to debug the program in memory.
The all new MORLEY MASTER BOARD "AA" allows you to have up to 8 x 16k and 4 x 32k extra Roms installed inside your MASTER and still leaves the cartridge slots free. This in effect allows your MASTER to support as many as 24, 16k ROMs installed permenantly, with the addition of your standard 4 x sideways ram banks and four banks by using cartridges.
A staggering 32 ROM images installed and accessible at any time.
Included in the package is a utility ROM which has many useful features including a clever file transfer program that transfers files between DFS and ADFS formats or vice versa.

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The Morley range of Winchester Drives are completely compatible with all BBC's, B+'s and Master computers fitted with ADFS.
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We now stock a full range of computer concepts software and will gladly populate your 'AA' board or cartridge before despatch.

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SOFTWARE QUICKIES

Smiling through your beard

Petra Galloway looks at art on a shoestring from Leonardo

NOT counting the one on the Welcome disc, up to now there were only two art packages for the Archimedes. The first to appear, Artisan from Clares, was the most professional, but only used the 16-colour Mode 12. Arctist from Fairhurst Instruments was next, using Mode 15 with its 256 colours, but it lacked polish and had few advanced facilities.

Now there's Leonardo: It uses Mode 12 like Artisan, but rather than being a painting package it's more of an advanced pixel editor. All the shape drawing options are the standard ones supplied by the operating system, but there is also an airbrush with random dots – the one feature really missing from Artisan.

Colours are selected via the palette and there is a dither option that invokes the more advanced multi-colour fills available – giving more colours. Although Artisan is more comprehensive Leonardo scores on ease of use.

BEARD TECHNOLOGY presents

Leonardo

Mode 12 Archimedes Art Package

(c) 1988 Mike Williams

However, where Leonardo beats both Artisan and Arctist completely is in its zoom capabilities. Arctist does have the facility but it's a beast to use: Artisan has three levels of zoom but you can only edit individual pixels. But Leonardo – oh joy – allows you to use *all* the graphics facilities in each of its four levels, which means you can place objects with absolute accuracy.

Other goodies include the ability to issue star commands directly to do such things as print the screen, QSAVE and QLOAD for fast and compressed screen saving and easy scrolling of the picture when it is zoomed. Finally, it's possible to interface Leonardo directly with the Watford Video Digitiser, so you can load and edit grabbed pictures.

All in all this is a nice package, easy to use and friendly: The only thing I really missed was the ability to load and save individual sprites.

Product: Leonardo
Price: £17.50
Supplier: Beard Technology, 111 Evering Road, London N16 7SL
Tel: 01 806 4460

Mightier than the sword

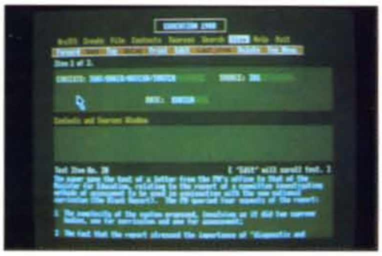
Teri Paul researches a new database tool for academics

DATABASES are a very useful way of storing data, but the most common ones have serious limitations when it comes to storing large amounts of textual information: You need to specify exactly the size shape and attributes of every field within a record.

ArcTFS – Archimedes Text Filing System – is a free-form database so it doesn't have this drawback as each record can contain a lump of text of undefined length with various subject tags attached to it.

However, each tag has its own definition record stating what it stands for: And there's a Source record to describe where the text item has come from. This is kept seperate because you may get more than one text item from the same source reference work.

At some future date you can choose one or more tags and get a list of all the text data that your free-form database contains. ArcTFS has the added advantage of letting you create output files containing the selected data in a word processor-readable form. This capability makes it ideal for academics, journalists or students who need to hold lots of text data for research.



The program itself is fairly straightforward to use and booting it up presents you with a screen divided into four main areas. At the top – apart from the title – there is a menu bar where only the functions available are highlighted and may be selected and just below this appear secondary menus.

Next come three windows: The linker shows what contexts and sources refer to the current text, which below this is the dialogue window for data entry for the context and source files. At the bottom is the largest area for editing the actual text data.

This is a well-written program and very powerful in its own field.

Product: ArcTFS
Price: £29.95
Supplier: Texcellence, 2 Greenhill Road, Coleraine, N. Ireland BT51 3JE

A word in your micro

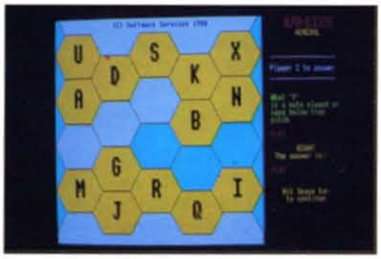
Fred Ingles questions whether this new game is worth the fee

BLOCKBUSTERS is a very popular childrens TV quiz that has spawned a lot of micro imitations. Not to be outdone Software Services has produced one for the Archimedes.

The game is played using a board composed of hexagonal areas with a letter of the alphabet at the centre of each. The two players – or teams – take turns to choose a letter and answer a question to which the correct response begins with the chosen letter.

Success results in that hexagon being filled in with that players colour and the same person choosing another letter. Failure means that the other player has a turn.

The aim is for one player to connect the top and bottom of the board with hexagons of his colour and for the other to join the left and right sides – a stalemate is impossible.

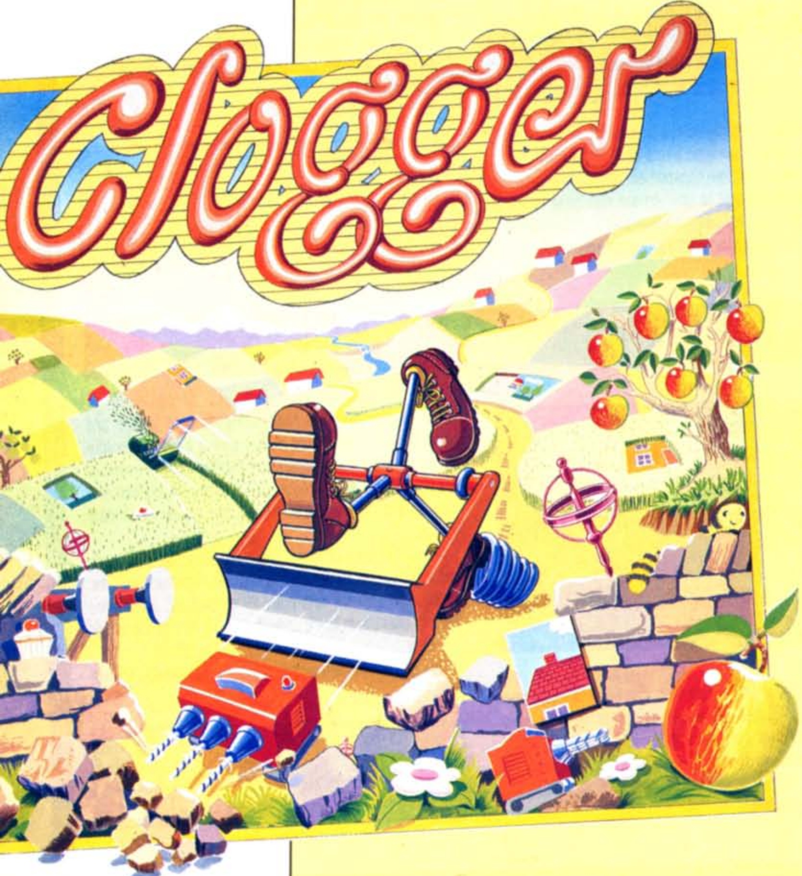


This version produces a very creditable board using nice, muted colours. The micro chooses a hexagon at random and the fastest person to the key and a correct answer goes first. When an answer does not exactly match the micro's version the opponent is asked whether the answer given is acceptable. This is a reasonably fair method and is common to all micro games of this type.

There are 2,700 questions included on the disc so repetition is unlikely, but all in all I found it a bit dull. Perhaps it would do well as a gift this time of the year – but the price seems a bit high.

Product: Alpha-Blockers
Price: £17
Supplier: Software Services, 65 South Mossley Hill Road, Allerton, Liverpool L19 9BG.
Tel: 051 427 7894

Gentle art of clogging



IN a strange and mystical land lives a peaceful race of beings known as the Cloggers – unusual creatures with three feet and no head. They have strange powers that let them perceive their environment in a way that is incomprehensible to man. They also have a great love of art, and the aim of all Cloggers is to reach the exalted status of Master by proving their artistic appreciation in a series of cunningly conceived tests.

In these they must reassemble various pieces of artwork which are scattered around dangerous landscapes in the hidden valleys of Clogland. Now you have the chance to reach this status.

To become a Master Clogger you must complete the 18 landscapes without using passwords – you have five lives with which to do this. Each landscape is progressively more complex with increasing numbers of individual tests of initiative.

On each you have to gather 21 pieces of a picture and push them to the finish area where they must be placed correctly to build up the complete masterpiece. You must also eat all the cakes and when both objectives have been achieved the level will end and you can move on to the next. You will be given the password for that level so you can practice without repeating lower ones.

The finish area is always seven objects wide by three high but can be anywhere on a particular level and you'll find it full of earth which you'll need to remove before the pieces can be inserted.

On the cover disc you'll find a demonstration version of Clogger with three full screens. You'll have hours of fun with these – but remember one ill-considered action can imperil your whole future.

Once you've mastered the art of Clogging, the full version – with all 18 screens – is available either from *The Micro User* or Impact Software – details are given on the disc.

So, can you become a Master Clogger?

INSTRUCTIONS

Certain pieces of artwork may seem inaccessable. You will have to find the route to them by moving or using lawnmowers, buffers, gyroscopes and drills on the way. This must be done in a limited time.

A map of each level can be obtained by pressing M. Time will continue to tick away, so plan your strategy quickly. If you want to practise different levels press E on the title screen and Enter the password – provided you have discovered it.

To see the finished picture which you are assembling press P. You can also see the clock ticking away – appreciating the finer points of the artwork is not recommended at this stage. Time is limited for each level and if it runs out you will run out of energy and lose a life.

However your energy – and therefore your time – can be increased by eating cakes. These will each give you an extra 30 seconds worth of energy but don't eat too much at once – the maximum time you can have at any stage is 10 minutes. So don't hang about.

You can see how well you're doing at any time by looking at the status screen – press S while you're playing. This is the only stage that time stands still.

CLOGGER'S ALMANAC

While the ability to complete the tests that will make you a Master Clogger depends on your skill and initiative, the Clogland Council does supply a brief advisory almanac describing the hazards that await you and tools at your disposal. Read carefully:

Cakes increase your energy – and thereby increase your time – by 30 seconds. Don't forget that all the cakes must be eaten before a level can be completed.

Apples increases your score and removes a possible barrier.

Earth gets in the way: If in doubt remove it, but don't waste time.

Cloggrass is fatal on contact – it can be removed with a lawnmower.

Springs form a barrier unless approached from one particular side when it will be removed.

Gyroscopes fly off when pushed until stopped by another object or deflected to their original position by a spring.

Buffers are used to solve problems caused by gyroscopes.

Drills will cut through any three objects and then disappear. There are two drills on each level. One drills to the left and the other to the right. It is advisable to only use drills to cut through objects that cannot be removed in any other way.

KEYS

The options available from the status screen:

P	View picture
M	View map
T	Tune toggle
Escape	Quit game
Spacebar	Return to game

The controls you must use in your quest to become Master Clogger:

Z	Move left
X	Move right
:	Move up
/	Move down
P	View picture
M	View map
S	View status screen – and pause
Escape	Kill yourself

FREE DISC

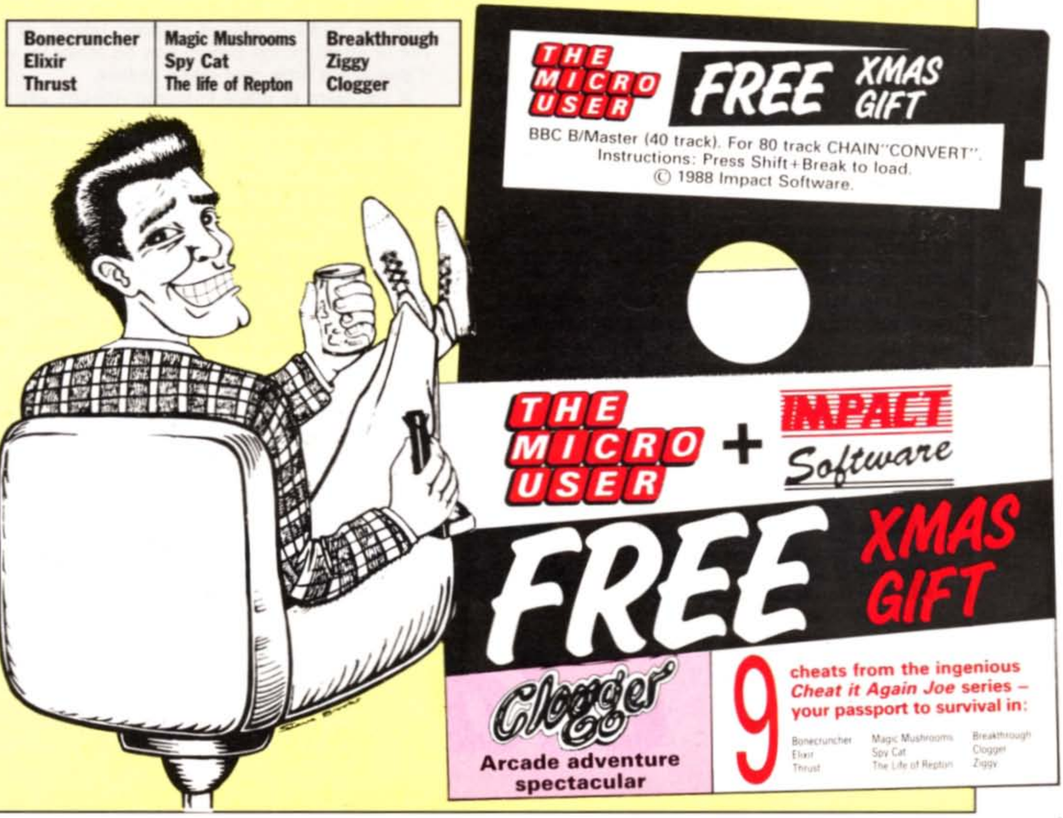
On your free cover disc there is a demonstration version of Clogger with three full screens for you to complete. So you can have hours of fun while you assess the problems facing Cloggers.

And there are also nine great cheats from Impact Software's Play it Again Joe series. If you've been having problems with your games, now you can make playing those listed below easy. Yes, there's even a cheat for Clogger. If you want to use a drill more than three times, have more time, become immune to Cloggrass or make the game easier to get to grips with in some other way, it's all possible.

We're sure you'll have lots of fun with your free gift from *The Micro User* and Impact Software.

Have a Merry Christmas!

Bonecruncher **Elixir** **Thrust**	**Magic Mushrooms** **Spy Cat** **The life of Repton**	**Breakthrough** **Ziggy** **Clogger**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BBC B/Master (40 track). For 80 track CHAIN"CONVERT".
Instructions: Press Shift+Break to load.
© 1988 Impact Software.
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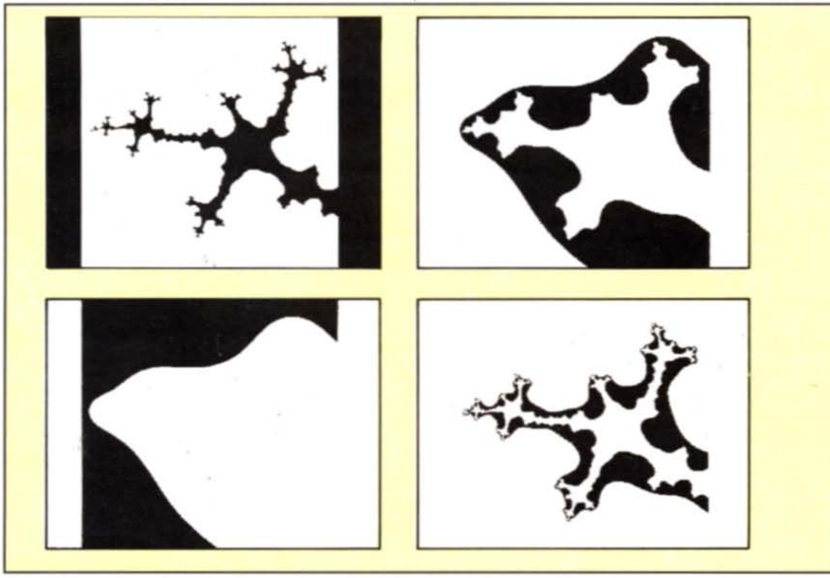
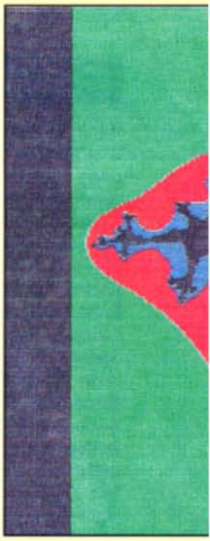
Breakthrough
Clogger
Ziggy

New ribbons for old

Bruce Goatly shows how you can easily revive old cartridges





These four separations can be used to print full colour picture on the right

DON'T throw that used ribbon away. If your printer uses an *endless* fabric one and if, like me, you resent having to buy new ribbons here is an easy way to economise: Re-ink them yourself. Not only will it save money, but also you will have the chance to print your favourite graphics screens in colour.

> *It will save money and you'll have the chance to print your graphic screens in colour*

All you need are a bottle of stamp-pad – not Indian – ink, some paper handkerchieves, a sheet of plastic or a newspaper to protect your work surface, some rubber gloves if you prefer to keep your hands clean and about half an hour.

As you'll also need three hands – one to wind on the ribbon, one to hold the ink bottle and one to grip the ribbon cassette – you should either get a friend to help, or use a vice or your knees to grip the cassette. Wearing old clothing is recommended.

So, having arranged yourself and the ribbon, apply an excess of ink by putting the nozzle of the bottle to the ribbon surface without squeezing the bottle and turn the take-up knob to advance the ribbon. Surface tension should make the ink flow on to the ribbon, although the bottle may occasionally need squeezing gently.

Make sure that the whole ribbon width is being made shiny with ink, using the nozzle as a spreader if necessary, and keep up the tension with the take-up knob. Continue until the whole ribbon has been treated then cap the ink bottle and put it aside.

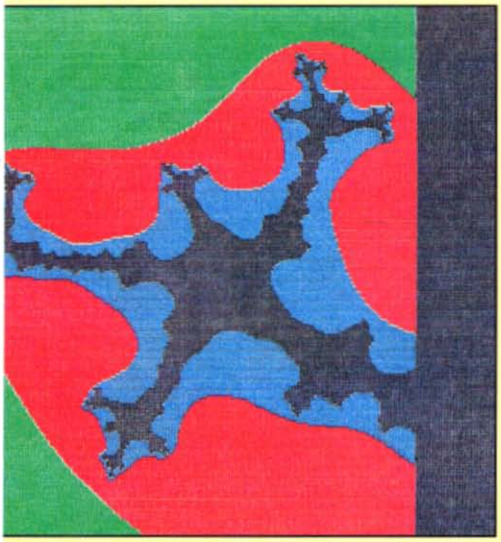
The second stage is to remove the surplus ink. Fold a paper handkerchief into a pad and hold it – on open fingers – in contact with the underside of the ribbon. You'll see the shiny areas go dull as the ink is absorbed into the paper.

Wind the inky ribbon over the pad, watching the absorption of the ink, moving frequently to fresh areas of the pad and changing it as necessary, until the pad has almost stopped taking up ink. The re-inked ribbon should now be ready for use, if perhaps a little over-inked at first.

If you want to make coloured ribbons you can start with well-used black ones – the new colour should swamp the old. Then you can start printing multicoloured pictures.

Printing in more than one colour calls for the use of *separations*, which are simply the separate images for each colour: A multicolour graphics screen has to be split up into its component colours so that each can be printed with a different ink.

There are several ways of doing this so let's look at two: Using the utility given here and any dump routine, or using a dump program that allows masking. Either way you need a disc or cassette containing a saved screen that was drawn in one of the multicoloured graphics



modes 1, 2 or 5.

In the panel we look at how to use Watford Electronics DumpOut 3 for colour printouts, but if you haven't got a dump rom or utility that allows masking ensure your screen file's title is no longer than six characters. Listing I creates the separations so type it in, check it with Get it Right! and save it.

Because the program addresses screen memory directly for the sake of speed, it will not work with shadow ram turned on, so if you have it turn it off with *SHADOW 0.

If you are using cassette rather than disc you should turn off all screen messages with:

```
*OPT 1,0
*OPT 2,0
```

to avoid corrupting the screen display. Using cassette takes ages but the principle is the same, so in what follows I shall refer only to disc.

Before you run the program make sure the disc has enough room on it for the separated screens: Mode 1 requires up to 100k, Mode 2 up to 340k and Mode 5 up to 50k.

These figures can be reduced by decreasing the number of separations to be made, set by *colours%* in line 140 – Mode 2 only has eight useful colours – or by adjusting the program to make it wait to let you change discs. The line where this would be necessary is indicated by a REM. Each of the separation discs must have the original graphics screen on, as it has to be reloaded after every separation process.

When you run the program you are first asked whether you want white to print out as white: This lets you reduce the number of separations by one – assuming you are printing on white paper. In other words, if you choose this option the separation for the white image will not be made or printed out.

Next specify which screen mode the saved picture is in. The program ensures that the physical

Turn to Page 119 ▶

USING DUMPOUT 3

If you have Watford's Dumpout 3 rom you can save yourself the trouble of typing in the listed programs because it has a mask parameter – M – that lets you select one or more colours for printing separately.

As we said in the article about this rom in the August issue of *The Micro User*, describing how masking works would be a whole article in itself – but you don't need to understand it to use it.

Table I lists the mask numbers that should follow the M parameter for each colour in Modes 1 and 5, and Table II lists the mask numbers for Mode 2. Each corresponds to one or two colours that will be *let through* the mask and allowed to print, so to print several colours in the same ink simply add the mask numbers together.

If you leave the P option alone – and I suggest you do for this exercise – the colour numbers are the logical colours for the screen mode, as mentioned for the separation program.

For multicolour work you will probably want each colour to be printed solid rather than as a grey tone, so use the T option to choose two-tone printing. To lighten the print density of a dark ink you can use the F option, which will let a little of the white of the paper show through.

Colour number	Mask number
0	00000001
1	00000100
2	00010000
3	01000000

Table I: Masks for Modes 1 and 5

Colour number	Mask number
0,8	00000001
1,9	00000100
2,10	00010000
3,11	01000000
4,12	00000010
5,13	00001000
6,14	00100000
7,15	10000000

Table II: Masks for Mode 2

Colour printing from DumpOut 3

Get it right!

```
 10 REM DumpOut 3 Demo Dumper
 20 REM by Brucé Goatly
 30 REM (c) The Micro User
 40 MODE1
 50 *LOAD MANDEL
 60 *GIMAGE EPS F T M00000001
 70 VDU2,12,3,7
 80 PRINT"Change ribbon/rewind paper"
 90 REPEAT UNTIL GET=32
100 *LOAD MANDEL
110 *GIMAGE EPS F T M00000100
120 VDU2,12,3,7
130 PRINT"Change ribbon/rewind paper"
140 REPEAT UNTIL GET=32
150 *LOAD MANDEL
160 *GIMAGE EPS F T M00010000
170 VDU2,12,3,7
180 PRINT"Change ribbon/rewind paper"
190 REPEAT UNTIL GET=32
200 *LOAD MANDEL
210 *GIMAGE EPS F T M01000000
220 VDU2,12,3,7
```

```
 10 =    0 0
 20 =    0 0
 30 =    0 0
 40 = EA3A A
 50 = 2A54 D
 60 = 2A5F 7
 70 = E9D3 3
 80 = 940F 4
 90 = 2B9E 0
100 = 2A54 E
110 =  D4E 6
120 = E9D3 F
130 = 940F 6
140 = 2B9E A
150 = 2A54 4
160 = 902F 7
170 = E9D3 4
180 = 940F F
190 = 2B9E B
200 = 2A54 5
210 = 821F 3
220 = E9D3 1
```

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colours are also the logical ones – the palette is not changed by a VDU19 command – so white is colour 3 or 7 according to the mode. Finally, enter the picture's filename.

Then sit back and enjoy the show as the various colours are read and saved to disc as separate files. These are automatically given names based on the original screen name, prefixed with S. to show they are screen images, and ending with the colour number.

To print out the separated colours you can use a short program such as Listing II after making necessary alterations to the number of colours, the mode, the filename and the name of your printer dump routine. After each screenful has been printed out the program waits for a keypress to give you time to realign the paper and change the ribbon: You will need to keep track of which order the colours come in and whether the disc needs changing.

Accurate realignment of the paper after each colour is crucial for successful multicolour printing. The best way to do this is to line the perforations between the sheets up to a fixed point – say, the tear-bar.

The listing on the previous page gives you a routine that prints out the four separations of the screen-file *MANDEL* using DumpOut 3 and illustrated are the four images produced if you don't change the ribbon or rewind the paper. You can see how they can be pieced together in different colours to give the coloured illustration.

So now you can retrieve those old ribbons, save money and get colourful. Even if you don't want to make coloured screen dumps, it's surprising how much more interesting a letter looks in bright colours than in black.

Listing I: Colour separator

```
   10 REM Graphics colour separator
   20 REM By Bruce Goatly
   30 REM (c) The Micro User
   40 ONERRORMODE7:PROCerror:END
   50 MODE7
   60 PROCass
   70 VDU23,255,0;0;0;255,0
   80 PRINT"Do you wish white to print a
s white?   (Y/N) ";
   90 REPEATA%=GETAND&DF:R%=INSTR("YN",C
HR$A%):UNTILR%>0:VDUA%
  100 PRINT'"Screen mode?"
  110 REPEAT M%=GET:M%=M%-48:UNTILM%=1 O
R M%=2 OR M%=5
  120 MODE M%:PRINTTAB(5,1)"Mode ";M%
  130 IFM%=1 OR M%=2 S%=&3000 ELSE S%=&5
800
  140 IFM%=2 colours%=16:white=7:?loops=
2:READ A%,A%,A%,A% ELSE colours%=4:white
=3:?loops=4
  150 S$=FNin("Screen file name: ",6,3,3
)
  160 FOR C%=0 TO colours%-1
  170 READ B%
  180 IF NOT(R%=1 AND C%=white) PROCscan
(S$,B%,S%,S$+STR$~C%)
  190 REM IF C%=2 OR C%=5 OR ...etc... V
DU7:A=GET:REM Use a line like this to le
t you change discs
  200 NEXT
  210 VDU23,1,1;0;0;0;
  220 END
  230 :
  240 DEFPROCoscli($&700):LOCALX%,Y%:Y%=
7:CALL&FFF7:ENDPROC
  250 :
  260 DEFFNin(m$,len%,x%,y%):PRINTTAB(x%
,y%)m$STRING$(len%,CHR$255);
  270 R$="":VDU8,8,8,8,8,8:*FX21
  280 VDU23,1,1;0;0;0;:REPEAT:REPEAT:A%=
GET:UNTIL(A%>31 AND A%<128)ORA%=13
  290 IFR$>""IFA%=127VDUA%,255,8:R$=LEFT
$(R$,LENR$-1)
  300 IFA%<>127IFA%<>13IFLENR$<len% R$=R
$+CHR$A%:VDUA%
  310 UNTILA%=13:VDU23,1,0;0;0;0;
  320 =R$
  330 :
  340 DEFPROCerror:IFERR<>17REPORT:PRINT
ERL
  350 CLOSE#0
  360 ENDPROC
  370 :
  380 DEF PROCscan(S$,A%,S%,o$)
  390 PROCoscli("LOAD "+S$)
  400 !ptr=S%:?colour=A%:Y%=0:CALLscan
  410 PROCoscli("SAVE S."+o$+" "+STR$~S%
+" 8000")
  420 ENDPROC
  430 :
  440 DATA &00,&01,&10,&11
  450 DATA &00,&01,&04,&05
  460 DATA &10,&11,&14,&15
  470 DATA &40,&41,&44,&45
  480 DATA &50,&51,&54,&55
  490 :
  500 DEF PROCass
  510 DIM code 256
  520 ptr=&70:colour=&72
  530 mask=&73:byte=&74
  540 wkcol=&75:loops=&76
  550 FOR L%=0 TO 2 STEP 2
  560 P%=code:[OPT L%
  570 .scan
  580 STY byte
  590 LDA #&11
  600 STA mask
  610 LDA colour
  620 STA wkcol
  630 LDY #0
  640 LDA (ptr),Y
  650 LDY loops
  660 TAX
  670 .innerloop
  680 AND mask
  690 CMP wkcol
  700 BNE skipit
  710 LDA byte
  720 ORA mask
  730 STA byte
  740 .skipit
  750 ASL mask
  760 ASL wkcol
  770 TXA
  780 DEY
  790 BNE innerloop
  800 LDA byte
  810 STA (ptr),Y
  820 INC ptr
  830 BNE skip2
  840 INC ptr+1
  850 .skip2
  860 BIT ptr+1
  870 BPL scan
  880 RTS
  890 ]:NEXT:ENDPROC
```

Get it right!

```
 10 =    0 0 | 310 = 43BE B | 610 = 6CB9 A
 20 =    0 0 | 320 = 8BCF 1 | 620 = FC75 4
 30 =    0 0 | 330 = 9719 D | 630 = 9CF1 D
 40 = 46C8 8 | 340 = 8FC8 0 | 640 = B4FB B
 50 = 8AFC 2 | 350 = 9EE3 0 | 650 =  91B E
 60 = CD80 4 | 360 = ED0F 5 | 660 = 670E 1
 70 = 1190 1 | 370 = 9719 9 | 670 = 291E E
 80 = 6D45 1 | 380 = 1D0D 0 | 680 = 905C 1
 90 = C511 C | 390 = 3EBF 2 | 690 = 442C 6
100 =  DEE 8 | 400 = F011 8 | 700 = D3F5 4
110 = BAB7 1 | 410 = AFE5 C | 710 = D6F4 D
120 = D6EB F | 420 = ED0F 4 | 720 =  1F3 A
130 =  234 A | 430 = 9719 F | 730 =  5F9 0
140 = AF1A 5 | 440 = 31F0 D | 740 = DF2D 5
150 = FA93 8 | 450 = 8EE3 1 | 750 = A699 9
160 = E4C4 1 | 460 = EC56 4 | 760 = 44FE D
170 = 9D3E C | 470 = 1416 C | 770 = 5DFD E
180 = 88AF 8 | 480 = 76A3 3 | 780 = F888 2
190 =    0 8 | 490 = 9719 E | 790 = C0F1 D
200 = 2C83 2 | 500 = 2FC3 3 | 800 = D6F4 9
210 = 59B7 4 | 510 = B3C2 3 | 810 = FE63 7
220 = FD2E 1 | 520 = 85DB 1 | 820 = 9627 A
230 = 9719 D | 530 = E355 0 | 830 = CF17 6
240 = CCAE A | 540 = 6EEB 8 | 840 = 1AA6 B
250 = 9719 8 | 550 = AAB9 E | 850 = 1A80 0
260 = 8B13 5 | 560 = 7CBB 7 | 860 = F73A E
270 = B08E 3 | 570 = 69FD A | 870 = 5447 4
280 = 5316 C | 580 = 123F E | 880 = 9843 0
290 = BC6B C | 590 = 546B 7 | 890 = 953B A
300 = CEC7 F | 600 = 438C B |
```

Listing II: Screen dumper for separated screens

Get it right!

```
   10 REM Simple screen dumper
   20 REM by Bruce Goatly
   30 REM (c) The Micro User
   40 REM Adjust lines 30 to 60
   50 FORcolour%=0TO2
   60 MODE1
   70 OSCLI("LOAD S.<filename>"+STR$~col
our%)
   80 *PRINT
   90 A=GET
  100 NEXT
```

```
 10 =    0 0
 20 =    0 0
 30 =    0 0
 40 =    0 0
 50 = C7E4 4
 60 = EA3A 3
 70 =  95F 2
 80 = 89E5 F
 90 = BC1B D
100 = 2C83 4
```

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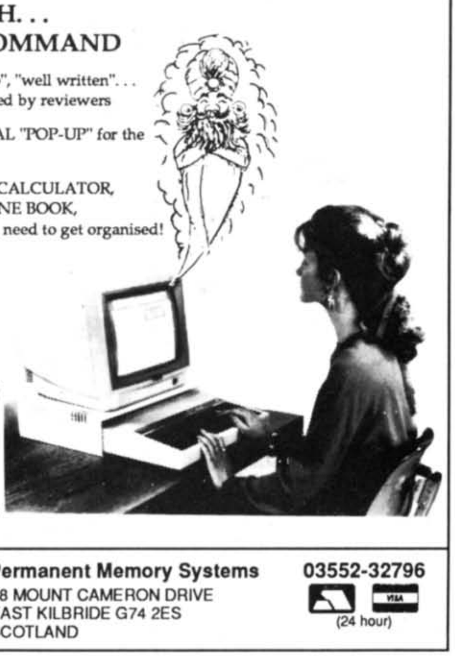

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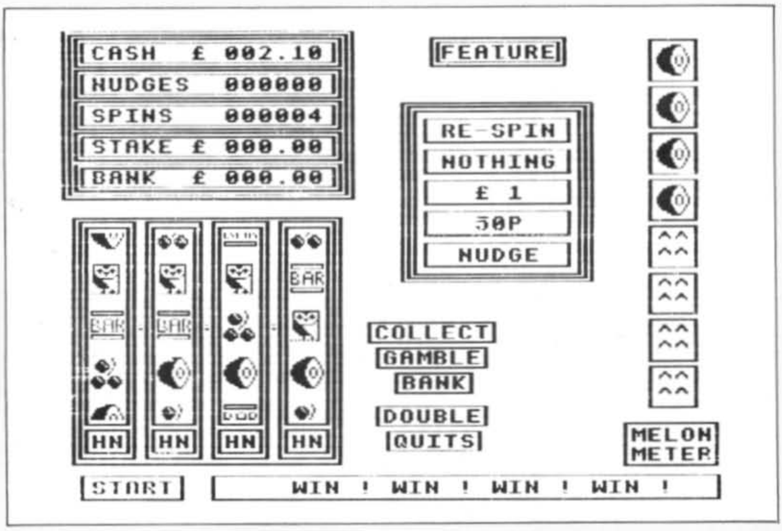
```
  280 VDU 23,248,127,67,73,92,75,97,112,
127
  290 VDU 23,249,252,132,36,116,164,12,2
0,228
  300 VDU 23,250,124,126,63,31,15,2,6,17
0
  310 VDU 23,251,4,4,4,132,196,36,116,17
2
  320 ENDPROC
  330 DEFPROCreels
  340 MM=0
  350 SPNS=0
  360 CA=250
  370 DIM F$(12),R$(4),P$(4),V(4),R1(4)
  380 DIM R2(4),R3(4),R4(4),H(4)
  390 FOR L=1 TO 4:READ R1(L):NEXT L
  400 FOR L=1 TO 4:READ R2(L):NEXT L
  410 FOR L=1 TO 4:READ R3(L):NEXT L
  420 FOR L=1 TO 4:READ R4(L):NEXT L
  430 FOR C=236 TO 248 STEP 4
  440 P$((C-232)/4)=CHR$(C)+CHR$(C+1)+CH
R$(10)+CHR$(8)+CHR$(8)+CHR$(C+2)+CHR$(C+
3)+CHR$(10)+CHR$(8)+CHR$(8)+"  "+CHR$(10
)+CHR$(8)+CHR$(8)
  450 NEXT C
  460 R$(1)=P$(1)+P$(2)+P$(3)+P$(4)
  470 R$(1)=R$(1)+R$(1)+R$(1)
  480 R$(2)=P$(2)+P$(4)+P$(1)+P$(3)
  490 R$(2)=R$(2)+R$(2)+R$(2)
  500 R$(3)=P$(3)+P$(1)+P$(4)+P$(2)
  510 R$(3)=R$(3)+R$(3)+R$(3)
  520 R$(4)=P$(1)+P$(4)+P$(3)+P$(2)
  530 R$(4)=R$(4)+R$(4)+R$(4)
  540 ENDPROC
  550 DEFPROCspin
  560 ST=0:BA=0:PROCBAST
  570 SPNS=SPNS+1
  580 PRINTTAB(16-LEN(STR$(SPNS)),6);SPN
S
  590 FOR L=1 TO 4
  600 IF H(L)=1 GOTO760
  610 FOR P=0 TO 12
  620 F$(P)=MID$(R$(L),P*5+5,58)
  630 NEXT P
  640 FOR H=1 TO 2
  650 FOR G=12 TO 1 STEP -1
  660 PRINTTAB(4*L-1,14)F$(G)
  670 NEXT G
  680 NEXT H
  690 V(L)=RND(4)
  700 FOR G=12 TO 3*V(L)-3 STEP -1
  710 PRINTTAB(4*L-1,14)F$(G)
  720 NEXT G
  730 FOR D=L*20 TO L*20+100 STEP 10
  740 SOUND 1,-15,D,.5
  750 NEXT D
  760 NEXT L
  770 FOR L=1 TO 4
  780 IF H(L)=0 V(L)=V(L)-2
  790 IF V(L)<1 V(L)=V(L)+4
  800 NEXT L
  810 IF R1(V(1))=R2(V(2)) PROCWIN:PROCG
AMBLE ELSE PROCMEL
  820 FORL=1 TO 4:H(L)=0:NEXT L
  830 ENDPROC
  840 DEFPROCBOX(X,Y,L,H)
  850 MOVE X,Y:DRAW X+L,Y:DRAW X+L,Y+H
  860 DRAW X,Y+H:DRAW X,Y:DRAW X-4,Y
  870 DRAW X-4,Y+H:DRAW X+L+4,Y+H
  880 DRAW X+L+4,Y
  890 ENDPROC
  900 DEFPROCscreen
  910 CLS
  920 VDU 19,7,0;0;0;0;
```



```
 930 PRINTTAB(2,27)"HN  HN  HN  HN"
 940 FOR X=56 TO 450 STEP 128
 950 PROCBOX(X,182,78,404)
 960 PROCBOX(X,122,78,48)
 970 PROCBOX(X-12,110,102,488)
 980 NEXT X
 990 PROCBOX(32,98,508,508)
1000 PROCBOX(50,24,186,48)
1010 PRINTTAB(2,30)"START"
1020 PROCBOX(300,24,970,48)
1030 PRINTTAB(2,2)"CASH  £ 000.00"
1040 PRINTTAB(2,4)"NUDGES  000000"
1050 PRINTTAB(2,6)"SPINS   000000"
1060 PRINTTAB(2,8)"STAKE £ 000.00"
1070 PRINTTAB(2,10)"BANK  £ 000.00"
1080 FOR Y=668 TO 950 STEP 64
1090 PROCBOX(50,Y,480,40)
1100 PROCBOX(38,Y-8,504,56)
1110 NEXT Y
1120 PROCBOX(26,652,528,328)
1130 PROCBOX(14,644,552,344)
1140 PRINTTAB(19,20)"COLLECT"
1150 VDU5:MOVE 626,330:PRINT"GAMBLE"
1160 MOVE 660,276:PRINT"BANK":VDU 4
1170 PROCBOX(618,296,204,40)
1180 PROCBOX(652,244,140,40)
1190 PROCBOX(600,348,236,40)
1200 VDU 5:MOVE 626,210:PRINT"DOUBLE"
1210 MOVE 646,158:PRINT"QUITS":VDU 4
1220 PROCBOX(618,176,204,40)
1230 PROCBOX(638,124,170,40)
1240 VDU 5:MOVE 1100,170:PRINT"MELON"
1250 MOVE 1100,130:PRINT"METER":VDU 4
1260 PROCBOX(1092,92,174,88)
1270 FOR L=2 TO 23 STEP 3
1280 PRINTTAB(36,L)P$(3)
1290 PROCBOX(1140,(26-L)*32+116,85,85)
1300 NEXT L
1310 FOR L=1 TO 3
1320 MOVE 128*L+30,386
1330 DRAW 128*L+34,386
1340 MOVE 128*L+30,376
1350 DRAW 128*L+34,376
1360 NEXT L
1370 PROCMON
1380 PRINTTAB(23,2)"FEATURE"
1390 PROCBOX(732,925,228,40)
1400 PROCBOX(720,917,252,56)
1410 PRINTTAB(24,15)"NUDGE"
1420 PRINTTAB(23,7)"RE-SPIN"
1430 PRINTTAB(23,9)"NOTHING"
1440 PRINTTAB(25,11)"£ 1"
1450 PRINTTAB(25,13)"50P"
1460 FOR Y=506 TO 800 STEP 64
1470 PROCBOX(710,Y,270,48)
1480 NEXT Y
1490 PROCBOX(690,490,310,334)
1500 PROCBOX(678,482,334,350)
1510 PROCBOX(666,474,358,366)
1520 FOR L=1 TO 4
1530 F$(1)=MID$(R$(L),20,58)
1540 PRINTTAB(4*L-1,14)F$(1)
1550 NEXT L
1560 VDU 19,7,7;0;0;0;
1570 ENDPROC
1580 DEFPROCMESSAGE(U$)
1590 COLOUR1
1600 LU=LEN(U$)
1610 U$=U$+"
1620 FOR L=38 TO (28-LU)/2+11 STEP -1
1630 PRINTTAB(L,30)LEFT$(U$,39-L)
1640 IF L MOD3=0 SOUND 1,-15,L*5,1
1650 FOR PL=1 TO 10:NEXT PL
1660 NEXT L
1670 ENDPROC
1680 DEFPROCDEL(U$)
1690 COLOUR1
1700 LU=LEN(U$)
1710 U$=U$+"
1720 U$=U$+"
1730 FOR L=(28-LU)/2+11 TO 11 STEP -1
1740 PRINTTAB(L,30)LEFT$(U$,39-L)
1750 FOR PL=1 TO 10:NEXT PL
1760 NEXT L
1770 FOR L=1 TO LU+1
1780 PRINTTAB(10,30)MID$(U$,L,LU+1)
1790 FOR PL=1 TO 10:NEXT PL
1800 NEXT L
1810 ENDPROC
1820 DEFPROCstart
1830 IF RND(100)<30 AND SPNS<>0 PROCHOL
```

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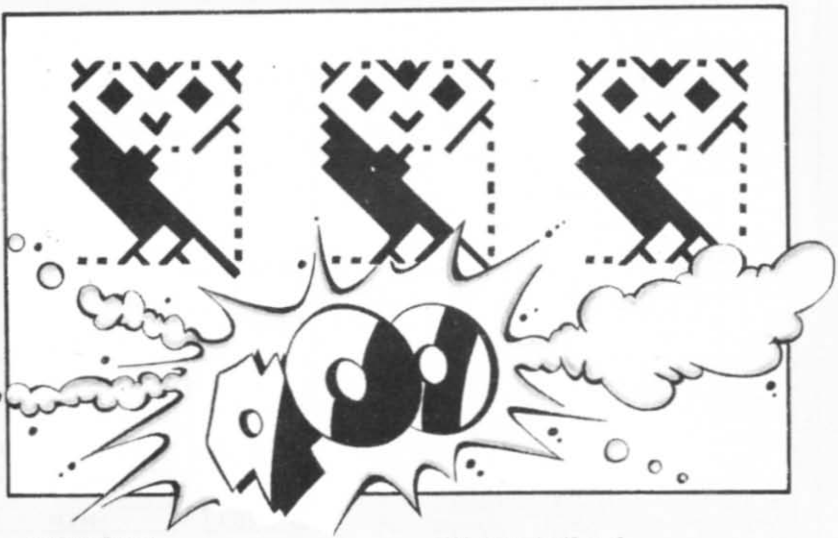

```
D:GOTO2010
 1840 FIN=FALSE
 1850 PROCMESSAGE("PRESS 'S' TO START")
 1860 CL=2
 1870 REPEAT
 1880 CL=3-CL
 1890 COLOUR CL
 1900 PRINTTAB(2,30);"START";
 1910 *FX15,1
 1920 FOR L=1 TO 100
 1930 K$=INKEY$(0)
 1940 IF K$="S" FIN=TRUE
 1950 NEXT L
 1960 UNTIL FIN
 1970 FOR L=250 TO 0 STEP -6
 1980 SOUND 1,-15,L,.3
 1990 NEXT L
 2000 PROCDEL("PRESS 'S' TO START")
 2010 COLOUR 1:PRINTTAB(2,30)"START"
 2020 CA=CA-10:PROCMON
 2030 PROCspin
 2040 ENDPROC
 2050 DEFPROCMON
 2060 PRINTTAB(9,2)" ";
 2070 W$=STR$(CA DIV 100)
 2080 IF LEN(W$)=0 PRINT"000"
 2090 IF LEN(W$)=1 PRINT"00"
 2100 IF LEN(W$)=2 PRINT"0"
 2110 PRINTTAB(13-LEN(W$),2)W$
 2120 W$=STR$(CA MOD 100)
 2130 PRINTTAB(16-LEN(W$),2)W$
 2140 IF VAL(W$)=0 PRINTTAB(14,2)"0"
 2150 IF CA<0 PROCEND
 2160 ENDPROC
 2170 DEFPROCWIN
 2180 PROCMESSAGE("WIN ! WIN ! WIN ! WIN
 !")
 2190 FOR L=1 TO 3
 2200 FOR P=1 TO 250 STEP 4
 2210 SOUND 1,-15,P,.3
 2220 NEXT P
 2230 FOR P=247 TO 4 STEP -4
 2240 SOUND 1,-15,P,.3
 2250 NEXT P
 2260 NEXT L
 2270 PROCDEL("WIN ! WIN ! WIN ! WIN !")
 2280 BA=0
 2290 IF R1(V(1))<>R3(V(3)) ST=20:ENDPRO
C
 2300 IF R1(V(1))<>R4(V(4)) ST=R1(V(1))*
100:ENDPROC
 2310 ST=R1(V(1))*100+500
 2320 ENDPROC
 2330 DEFPROCBAST
 2340 PRINTTAB(9,8)" 000.00"
 2350 IF BA=0 PRINTTAB(9,10)" 000.00"
 2360 W$=STR$(ST DIV 100)
 2370 PRINTTAB(13-LEN(W$),8)W$
 2380 W$=STR$(ST MOD 100)
 2390 PRINTTAB(16-LEN(W$),8)W$
 2400 W$=STR$(BA DIV 100)
 2410 PRINTTAB(9,10)" ";
 2420 IF LEN(W$)=0 PRINT"000"
 2430 IF LEN(W$)=1 PRINT"00"
 2440 IF LEN(W$)=2 PRINT"0"
 2450 PRINTTAB(13-LEN(W$),10)W$
 2460 W$=STR$(BA MOD 100)
 2470 PRINTTAB(16-LEN(W$),10)W$
 2480 IF VAL(W$)=0 PRINTTAB(14,10)"0"
 2490 ENDPROC
 2500 DEFPROCGAMBLE
 2510 PROCBAST
 2520 IF ST=0 ENDPROC
 2530 PROCMESSAGE("PRESS 'G' , 'B' OR 'C
'")
 2540 CL=7:CO=1
 2550 FIN=FALSE
 2560 REPEAT
 2570 CL=7-CL:CO=3-CO
 2580 COLOUR CO:GCOL 0,CL
 2590 PRINTTAB(19,20)"COLLECT"
 2600 VDU5:MOVE 626,330:PRINT"GAMBLE"
 2610 MOVE 660,276:PRINT"BANK":VDU 4
 2620 SOUND 1,-15,30*CL,1
 2630 FOR LOOP=1 TO 70
 2640 K$=INKEY$(0)
 2650 IF K$="C" OR K$="G" OR K$="B" FIN=
TRUE:Z$=K$
 2660 NEXT LOOP
 2670 UNTIL FIN
 2680 IF Z$<>"B" PROCDEL("PRESS 'G' , 'B
 OR 'C'")
 2690 GCOL 0,7:COLOUR1
 2700 PRINTTAB(19,20)"COLLECT"
 2710 VDU5:MOVE 626,330:PRINT"GAMBLE"
 2720 MOVE 660,276:PRINT"BANK":VDU 4
 2730 IF Z$="C" PROCCOLLECT:ENDPROC
 2740 IF Z$="B" PROCBANK:IF FB=-1 PROCCO
LLECT:ENDPROC ELSE IF Z$="B" GOTO2540
 2750 IF Z$="G" PROCRISK:IF ST<>0 GOTO025
20 ELSE IF Z$="G" AND BA=0 ENDPROC ELSE
IF Z$="G" PROCCOLLECT:ENDPROC
 2760 ENDPROC
 2770 DEFPROCCOLLECT
 2780 FOR D=20 TO 120 STEP 10
 2790 SOUND 1,-15,D,.5
 2800 NEXT D
 2810 BA=BA+ST:ST=0:PROCBAST
 2820 ML$=STR$(BA)+" P BANKED"
 2830 PROCMESSAGE(ML$)
 2840 FOR P=1 TO 1000:NEXT P
 2850
 2860 PROCDEL(ML$)
 2870 CL=1
 2880 PROCMESSAGE("PRESS A KEY TO COLLEC
T BANK ")
 2890 FIN=FALSE
 2900 REPEAT
 2910 COLOURCL:CL=3-CL
 2920 PRINTTAB(2,10)"BANK"
 2930 FOR LP=1 TO 100
 2940 IF INKEY$(0)<>"" FIN=TRUE
 2950 NEXT LP
 2960 UNTIL FIN
 2970 COLOUR1:PRINTTAB(2,10)"BANK"
 2980 FOR D=80 TO 180 STEP 10
 2990 SOUND 1,-15,D,.5
 3000 NEXT D
 3010 PROCDEL("PRESS A KEY TO COLLECT BA
NK")
 3020 E$=STR$(BA)+" P COLLECTED"
 3030 REPEAT:CA=CA+10:PROCMON:BA=BA-10
 3040 PROCBAST:SOUND1,-15,100,.2
 3050 FOR LP=1 TO 5:NEXT:UNTIL BA=0
 3060 BA=0:PROCBAST:PROCMESSAGE(E$)
 3070 FOR LP=1 TO 1000:NEXT LP
 3080 PROCDEL(E$)
 3090 ENDPROC
 3100 DEFPROCBANK
 3110 BA=BA+10:ST=ST-10:PROCBAST
 3120 IF ST=0 Z$="C":PROCDEL("PRESS 'G'
, 'B' OR 'C'"):FB=-1 ELSE FB=0
 3130 ENDPROC
 3140 DEFPROCRISK
 3150 PROCMESSAGE("PRESS ANY KEY")
 3160 CL=0
 3170 FIN=0
 3180 REPEAT
 3190 GCOL 0,CL:CL=7-CL
 3200 VDU 5:MOVE 626,210:PRINT"DOUBLE"
 3210 GCOL 0,CL:MOVE 646,158
 3220 PRINT"QUITS":VDU 4
 3230 UNTIL INKEY$(0)<>""
 3240 FOR LP=1 TO 400:NEXT LP:GCOL 0,7
 3250 VDU 5:MOVE 626,210:PRINT"DOUBLE"
 3260 MOVE 646,158:PRINT"QUITS":VDU 4
 3270 IF CL=7 PROCL:ENDPROC
 3280 PROCDEL("PRESS ANY KEY")
 3290 PROCMESSAGE("WIN ! WIN ! WIN ! WIN
 !")
 3300 FOR L=1 TO 3
 3310 FOR P=1 TO 250 STEP 4
 3320 SOUND 1,-15,P,.3:NEXT P
 3330 FOR P=247 TO 4 STEP -4
 3340 SOUND 1,-15,P,.3:NEXT P:NEXT L
 3350 ST=ST*2:PROCBAST
 3360 FOR LP=1 TO 1000:NEXT LP:PROCDEL("
WIN ! WIN ! WIN ! WIN !")
 3370 ENDPROC
 3380 DEFPROCL
 3390 PROCDEL("PRESS ANY KEY")
 3400 PROCMESSAGE("LOSE ! LOSE ! LOSE !"
)
 3410 ST=0:PROCBAST
 3420 FOR LP=1 TO 1000:NEXT LP
 3430 PROCDEL("LOSE ! LOSE ! LOSE !")
 3440 ENDPROC
 3450 DEFPROCHOLD
 3460 PROCMESSAGE("HOLD - PRESS 1,2,3,4,
C OR S ")
 3470 CL=1
 3480 FORL=1 TO 4:H(L)=0:NEXT L
 3490 REPEAT
 3500 FIN=FALSE
 3510 REPEAT
 3520 COLOUR CL:CL=3-CL
 3530 FOR LK=1 TO 4
 3540 IF H(LK)=0 PRINTTAB(2+(LK-1)*4,27)
"H":NEXT LK ELSE NEXT
 3550 PRINTTAB(2,30)"START"
 3560 FOR LP=1 TO 50
 3570 K$=INKEY$(0)
 3580 IF K$="1" OR K$="2" OR K$="3" OR K
$="4" OR K$="C" OR K$="S" Z$=K$:FIN=TRUE
 3590 NEXT LP
 3600 UNTIL FIN
 3610 FOR L=0 TO 200 STEP 40
 3620 SOUND 1,-15,L,.5:NEXT L
 3630 IF Z$="C" FORL=1 TO 4:H(L)=0:NEXT
L
 3640 IF Z$="1" H(1)=1:COLOUR1:PRINTTAB(
2,27)"HN"
 3650 IF Z$="2" H(2)=1:COLOUR1:PRINTTAB(
6,27)"HN"
 3660 IF Z$="3" H(3)=1:COLOUR1:PRINTTAB(
10,27)"HN"
 3670 IF Z$="4" H(4)=1:COLOUR1:PRINTTAB(
14,27)"HN"
 3680 UNTIL Z$="S"
 3690 COLOUR1:PRINTTAB(2,27)"HN"CHR$(9)C
HR$(9)"HN"CHR$(9)CHR$(9)"HN"CHR$(9)CHR$(
9)"HN"
 3700 PRINTTAB(2,30)"START"
 3710 PROCDEL("HOLD - PRESS 1,2,3,4,C OR
 S ")
 3720 ENDPROC
 3730 DEFPROCMEL
 3740 OM=MM
 3750 IF R1(V(1))=2 MM=MM+1
 3760 IF R2(V(2))=2 MM=MM+1
 3770 IF R3(V(3))=2 MM=MM+1
 3780 IF R4(V(4))=2 MM=MM+1
 3790 IF MM>8 MM=8
 3800 IF OM=MM ENDPROC
 3810 FOR L=OM+1 TO MM
 3820 PRINTTAB(36,26-(L*3-1));"**"
 3830 PRINTTAB(36,26-(L*3))"**"
 3840 SOUND 1,-15,L*4,6
 3850 FOR LP=1 TO 600:NEXT LP
 3860 NEXT L
 3870 IF MM=8 PROCNUD
 3880 ENDPROC
 3890 DEFPROCNUD
 3900 FOR L=1 TO 8
 3910 PRINTTAB(36,26-(L*3-1));"  "
 3920 PRINTTAB(36,26-(L*3))"  "
 3930 NEXT L
 3940 FOR LK=1 TO 4
 3950 FOR L=1 TO 8
 3960 PRINTTAB(36,26-(L*3-1));"**"
 3970 PRINTTAB(36,26-(L*3))"**"
 3980 SOUND 1,-15,L*30,2
 3990 FOR PL=1 TO 100:NEXT PL
 4000 PRINTTAB(36,26-(L*3-1));"  "
 4010 PRINTTAB(36,26-(L*3))"  "
 4020 NEXT L
 4030 NEXT LK
 4040 MM=0
 4050 FOR L=2 TO 23 STEP 3
 4060 PRINTTAB(36,L)P$(3)
 4070 PROCBOX(1140,(26-L)*32+116,85,85)
 4080 NEXT L
 4090 PROCFEAT
 4100 ENDPROC
 4110 DEFPROCFEAT
 4120 PROCMESSAGE("MELON-METER FEATURE")
 4130 FOR LP=1 TO 1000:NEXT
 4140 PROCDEL("MELON-METER FEATURE")
 4150 PROCMESSAGE("CHOOSE -- PRESS ANY K
EY")
 4160 CL=1
 4170 GL=0
 4180 FIN=0
 4190 REPEAT
 4200 COLOURCL:CL=3-CL
 4210 PRINTTAB(23,2)"FEATURE"
 4220 GL=GL+1:IF GL=6 GL=1
 4230 COLOUR1
 4240 PRINTTAB(19,5+GL*2)">"
 4250 PRINTTAB(33,5+GL*2)"<"
 4260 *FX15,1
 4270 FOR LK=1 TO 60
 4280 IF INKEY$(0)<>"" FIN=TRUE
 4290 NEXT LK
 4300 PRINTTAB(19,5+GL*2)" "
 4310 PRINTTAB(33,5+GL*2)" "
 4320 UNTIL FIN
 4330 PROCDEL("CHOOSE -- PRESS ANY KEY")
 4340 COLOUR1:PRINTTAB(23,2)"FEATURE"
 4350 IF GL=1 FOR L=1 TO 4:H(L)=0:NEXT L
:PROCRES:ENDPROC
 4360 IF GL=2 PROCNN:ENDPROC
 4370 IF GL=3 PROC100:ENDPROC
 4380 IF GL=4 PROC50:ENDPROC
 4390 IF GL=5 PROCNUDGE:ENDPROC
 4400 ENDPROC
 4410 DEFPROCNN
 4420 PROCMESSAGE("NOTHING")
 4430 FOR PL=1 TO 1000:NEXT PL
 4440 PROCDEL("NOTHING")
 4450 ENDPROC
 4460 DEFPROCRES
 4470 PROCMESSAGE("RE-SPIN")
```

```
4480 FOR PL=1 TO 1000:NEXT PL
4490 PROCDEL("RE-SPIN")
4500 PROCspin
4510 ENDPROC
4520 DEFPROC50
4530 PROCMESSAGE("50 P WIN")
4540 FOR PL=1 TO 1000:NEXT PL
4550 PROCDEL("50 P WIN")
 4560 ST=50
 4570 PROCGAMBLE
 4580 ENDPROC
 4590 DEFPROC100
 4600 PROCMESSAGE("£ 1 WIN")
 4610 FOR PL=1 TO 1000:NEXT PL
 4620 PROCDEL("£ 1 WIN")
 4630 ST=100
 4640 PROCGAMBLE
 4650 ENDPROC
 4660 DEFPROCNUDGE
 4670 FORL=1 TO 4
 4680 V(L)=V(L)+2
 4690 IF V(L)>4 V(L)=V(L)-4
 4700 NEXT L
 4710 NON=RND(8)+1
 4720 PG$="NUDGE -- "+STR$(NON)+" NUDGES
"
 4730 PROCMESSAGE(PG$)
 4740 FOR LP=1 TO 1000:NEXT LP
 4750 PROCDEL(PG$)
 4760 PRINTTAB(15,4);NON
 4770 PROCMESSAGE("PRESS 1,2,3 OR 4")
 4780 CL=1
 4790 DS$="N"+CHR$(9)+CHR$(9)+CHR$(9)+"N
"+CHR$(9)+CHR$(9)+CHR$(9)+"N"+CHR$(9)+CH
R$(9)+CHR$(9)+"N"
 4800 FIN=FALSE
 4810 REPEAT
 4820 COLOURCL:CL=3-CL
 4830 PRINTTAB(3,27)DS$
 4840 *FX15,1
 4850 FOR L=1 TO 40
 4860 K$=INKEY$(0):IF K$="1" OR K$="2" O
R K$="3" OR K$="4" Z$=K$:FIN=TRUE
 4870 NEXT L
 4880 UNTIL FIN
 4890 COLOUR1
 4900 L=VAL(Z$)
 4910 FOR P=0 TO 12
 4920 F$(P)=MID$(R$(L),P*5+5,58)
 4930 NEXT P
 4940 G=V(L)*3-3
 4950 PRINTTAB(4*L-1,14)F$(G)
 4960 G=V(L)*3-4:IF G<1 G=G+12
 4970 FOR P=1 TO 50:NEXT P
 4980 PRINTTAB(4*L-1,14)F$(G)
 4990 G=V(L)*3-6:IF G<1 G=G+12
 5000 FOR P=1 TO 50:NEXT P
 5010 PRINTTAB(4*L-1,14)F$(G)
 5020 V(L)=V(L)-1:IF V(L)=0 V(L)=4
 5030 NON=NON-1
 5040 PRINTTAB(15,4);NON
 5050 FOR L=1 TO 200 STEP 5
 5060 SOUND 1,-15,L,.3:NEXT L
 5070 FOR L=1 TO 4:V(L)=V(L)-2
 5080 IF V(L)<1 V(L)=V(L)+4
 5090 NEXT L
 5100 IF R1(V(1))=R2(V(2)) NON=0:COLOUR1
:PRINTTAB(3,27)DS$TAB(15,4)"0":PROCDEL("
PRESS 1,2,3 OR 4"):PROCWIN:PROCGAMBLE:EN
DPROC
 5110 FOR L=1 TO 4:V(L)=V(L)+2
 5120 IF V(L)>4 V(L)=V(L)-4
 5130 NEXT L
 5140 IF NON<>0 GOTO4800
 5150 COLOUR1:PRINTTAB(3,27)DS$
 5160 PROCDEL("PRESS 1,2,3 OR 4")
 5170 PROCMESSAGE("OUT OF NUDGES")
 5180 FOR LP=1 TO 1000:NEXT LP
 5190 PROCDEL("OUT OF NUDGES")
 5200 ENDPROC
 5210 DEFPROCEND
 5220 PROCMESSAGE("YOU'RE OUT OF MONEY")
```

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```
 5230 FOR LP=1 TO 1000:NEXT LP
 5240 PROCDEL("YOU'RE OUT OF MONEY")
 5250 END
 5260 ENDPROC
 5270 END
 5280 DEFPROCINTRO
 5290 CLS
 5300 VDU 19,7,0;0;0;0;
 5310 PRINTTAB(12,0)"FRUITS! - WINS"
 5320 FOR L=1 TO 4
 5330 PRINTTAB(1,3*L)P$(L)TAB(4,3*L)P$(L
)
 5340 PRINTTAB(7,3*L)"20 P"
 5350 NEXT L
 5360 FOR L=1 TO 4
 5370 PRINTTAB(20,3*L)P$(L)TAB(23,3*L)P$
(L)TAB(26,3*L)P$(L)
 5380 NEXT L
 5390 FOR L=1 TO 4
 5400 PRINTTAB(1,3*L+14)P$(L)TAB(4,3*L+1
4)P$(L)TAB(7,3*L+14)P$(L)TAB(10,3*L+14)P
$(L)
 5410 NEXT L
 5420 PRINTTAB(29,3)"300 P"
 5430 PRINTTAB(29,6)"100 P"
 5440 PRINTTAB(29,9)"200 P"
 5450 PRINTTAB(29,12)"400 P"
 5460 PRINTTAB(13,17)"800 P"
 5470 PRINTTAB(13,20)"600 P"
 5480 PRINTTAB(13,23)"700 P"
 5490 PRINTTAB(13,26)"900 P"
 5500 VDU 19,7,7;0;0;0;
 5510 PROCjingle1
 5520 PRINTTAB(13,30)"PRESS ANY KEY"
 5530 REPEAT
 5540 V=RND(1000)
 5550 UNTIL INKEY$(0)<>""
 5560 ENDPROC
 5570 DEFPROCindata
 5580 DIM n1(16),n2(99)
 5590 FOR loop=1 TO 16
 5600 READ n1(loop)
 5610 NEXT loop
 5620 FOR loop=36 TO 99
 5630 READ n2(loop)
 5640 NEXT loop
 5650 ENDPROC
 5660 DEFPROCjingle1
 5670 c=0
 5680 FOR c1=1 TO 99
 5690 c=c+1
 5700 IF c=17 c=1
 5710 IF c1<94 SOUND 1,-10,4*n1(c)-18,2
 5720 IF n2(c1)<>0 SOUND 2,-11,4*n2(c1)+
30,2
 5730 IF n2(c1)<>0 SOUND 3,-10,4*n2(c1)-
18,2
 5740 NEXT c1
 5750 ENDPROC
 5760 DATA 12,12,12,19,18,19,18,19,7,7
 5770 DATA 7,19,18,19,18,19,28,26,24,24
 5780 DATA 24,26,24,19,16,17,19,21,19
 5790 DATA 16,19,19,24,26,28,28,28,28
 5800 DATA 28,26,24,26,28,28,26,26,26
 5810 DATA 26,28,26,24,24,24,26,24,19
 5820 DATA 16,17,19,21,19,16,19,19,24
 5830 DATA 26,28,28,28,28,28,26,24,26
 5840 DATA 28,28,26,26,24,24,3,1
 5850 DATA 2,4,1,4,3,2,2,3,4,1,3,4,2,1
```

Get it right!

```
  10 =    0 0
  20 =    0 0
  30 =    0 0
  40 = 20F1 1
  50 = 6D88 5
  60 =  997 5
  70 = 1E07 A
  80 = D646 E
  90 = 3CD6 F
 100 = 9538 9
 110 = BFBA 1
 120 = 9D5F 0
 130 = 226C 5
 140 = FD2E A
 150 = F4F0 3
 160 = 1BFB 4
 170 = 47C3 F
 180 = 9DDF 0
 190 = 3F7D E
 200 = 2D94 4
 210 =  E55 A
 220 = F027 C
 230 = 2D1F F
 240 = D7A3 B
 250 = B773 A
 260 = 62B8 A
 270 = C0EC 5
 280 = 8868 7
 290 = 9D1A 4
 300 = 3A1A 0
 310 = 4B98 8
 320 = ED0F F
 330 = 7D22 F
 340 = 4D7C 7
 350 = 2584 9
 360 = 6D50 C
 370 = 34AE B
 380 = AE7E 0
 390 = E96C D
 400 = 2119 3
 410 = 66CA C
 420 = A1D2 0
 430 = 346F 7
 440 = 15F4 5
 450 = 9C21 5
 460 = 2B6D 0
 470 = 752D A
 480 = 8C6C 5
 490 = 3B7D A
 500 = E8F5 0
 510 =  14D F
 520 = B70B 0
 530 = A7DD 8
 540 = ED0F 8
 550 = AC59 8
 560 = 2879 9
 570 = 8FD6 3
 580 = 1C54 7
 590 = 496D B
 600 = 145C 3
 610 = 34AA 1
 620 = ADBC 1
 630 = BE73 4
 640 = E86D 5
 650 = 933B 0
 660 = 2CFB A
 670 = DCA5 6
 680 = 2D4A 3
 690 = D594 8
 700 = 6B60 4
 710 = 2CFB 8
 720 = DCA5 6
 730 = F5C2 3
 740 =    A 1
 750 = ECC6 C
 760 = 6DCE 9
 770 = 496D A
 780 = 7283 C
 790 = 8595 4
 800 = 6DCE 6
 810 = 3889 A
 820 = 2EBE A
 830 = ED0F 8
 840 =  E96 0
 850 = 9745 E
 860 = 77E3 2
 870 = 96AE 9
 880 = FD19 0
 890 = ED0F 6
 900 = F5B9 7
 910 = 7A16 4
 920 = E44D 4
 930 = 8A47 B
 940 = 7B18 B
 950 = 6BCA F
 960 =  E77 D
 970 = 4D76 8
 980 = 3F7B C
 990 = D8F4 3
1000 = 2226 3
1010 = 66B2 3
1020 = 70FE 0
1030 = 4447 5
1040 = 4D6E C
1050 = FEA6 9
1060 = B59E E
1070 = E82A C
1080 = B5F5 C
1090 = A7AD 9
1100 = 1830 A
1110 = 2F5A 3
1120 = 3BE8 6
1130 = ED72 E
1140 = 6915 D
1150 = 4668 4
1160 = CA8C 1
1170 = 1CC0 7
1180 = 7980 1
1190 = C59D E
1200 = 7A7C 4
1210 = 2C0C 5
1220 = 5DCE 8
1230 = 36DE E
1240 = 69A1 D
1250 = 3317 8
1260 =  B30 B
1270 = A231 6
1280 = AEF8 C
1290 = 22E5 D
1300 = 6DCE 1
1310 = 398A A
1320 = 6171 D
1330 = 3EEC 8
1340 = 714F F
1350 = 2ED2 C
1360 = 6DCE E
1370 = 9921 A
1380 = 1AC3 D
1390 = C9BD 8
1400 = 5CCB 3
1410 = 8ED8 6
1420 = 4116 E
1430 = FF22 D
1440 = 3871 2
1450 = EA94 2
1460 = 99DF B
1470 = D611 1
1480 = 2F5A D
1490 = 9618 A
1500 = 92B8 F
1510 = 7DF4 D
1520 = 496D 1
1530 = 89C5 3
1540 = 8E04 E
1550 = 6DCE 9
1560 = 2355 3
1570 = ED0F E
1580 = EADF 2
1590 = E949 1
1600 = EF5A 0
1610 = DD22 A
1620 =  B3B D
1630 = 209D B
1640 = 4A99 C
1650 = 7DDB E
1660 = 6DCE B
1670 = ED0F 4
1680 = F82F A
1690 = E949 1
1700 = EF5A 7
1710 = DD22 A
1720 = DD22 4
1730 = DCC0 5
1740 = 209D B
1750 = 7DDB F
1760 = 6DCE 8
1770 = 70AC 0
1780 = A1DF 6
1790 = 7DDB A
1800 = 6DCE 1
1810 = ED0F 4
1820 = 363B 2
1830 = 4DCC 9
1840 = B1EA 0
1850 = DADF 0
1860 = F854 B
1870 = BFBA A
1880 = EB7C 2
1890 = D643 5
1900 = 402C E
1910 = 7CA7 3
1920 = D269 E
1930 = 3278 1
1940 = FA8C B
1950 = 6DCE F
1960 = 9831 E
1970 = CD42 3
1980 = E50F 1
1990 = 6DCE D
2000 = B2F5 3
2010 = C435 1
2020 = D8A5 D
2030 = 46AE B
2040 = ED0F 2
2050 = 8FB9 D
2060 = 98CA 8
2070 = 24CB 8
2080 = BCE3 8
2090 = 238E 6
2100 = 9459 4
2110 = EB91 E
2120 = AF8B 5
2130 = E530 3
2140 = CA8D 8
2150 = 3A0E B
2160 = ED0F F
2170 = A1BD A
2180 = E072 B
2190 = 398A 4
2200 = 16D5 B
2210 = B19A 4
2220 = BE73 C
2230 = FF2B 9
2240 = B19A B
2250 = BE73 F
2260 = 6DCE 9
2270 = A466 4
2280 = ECF3 2
2290 = 1278 7
2300 = 64F8 4
2310 = 9C68 F
2320 = ED0F A
2330 = 79D6 3
2340 = 3445 4
2350 = 211F 4
2360 =  23F 2
2370 = 833A 0
2380 = 897F 5
2390 = 8D9B 4
2400 = CFE8 B
2410 = 1371 7
2420 = BCE3 D
2430 = 238E B
2440 = 9459 A
2450 = 21A2 C
2460 = 44A8 5
2470 = 616C 9
2480 = C5ED 2
2490 = ED0F 7
2500 = 4285 B
2510 = 9321 2
2520 = C0B4 7
2530 = AC31 A
2540 = 1A97 2
2550 = B1EA 7
2560 = BFBA 0
2570 = BF17 7
2580 = 26F9 1
2590 = 6915 2
2600 = 4668 4
2610 = CA8C 5
2620 = 8256 4
2630 = 75D9 8
2640 = 3278 4
2650 = E039 C
2660 = 9AFA D
2670 = 9831 5
2680 = 11B7 F
2690 = A4FE 4
2700 = 6915 4
2710 = 4668 8
2720 = CA8C 1
2730 = 13E9 4
2740 = 1BE0 F
2750 = 9D19 E
2760 = ED0F 1
2770 = 8AAE C
2780 = 630B C
2790 =    A 3
2800 = ECC6 6
2810 =  E61 A
2820 = EF58 C
2830 = 3B44 B
2840 = FF22 5
2850 =    0 5
2860 = A42D D
2870 = C837 8
2880 = AA00 8
2890 = B1EA 3
2900 = BFBA 7
2910 = FD8C 2
2920 = 9B5D 1
2930 = 31B5 D
2940 =  F40 5
2950 = 29FE 3
2960 = 9831 B
2970 = B821 7
2980 = 11D9 8
2990 =    A 4
3000 = ECC6 5
3010 = C56D F
3020 = 9FE0 D
3030 = 4386 7
3040 = DB73 0
3050 = EA16 E
3060 = 3CFA B
3070 = 2B77 D
3080 = 56EA 9
3090 = ED0F 8
3100 = EF27 E
3110 = B2CC C
3120 = A305 B
3130 = ED0F 1
3140 = ?80E 1
3150 = BC87 4
3160 = D816 9
3170 =  230 9
3180 = BFBA 0
3190 = 1873 6
3200 = 7A7C D
3210 = EF0F C
3220 = 1B37 0
3230 = DD29 2
3240 = F2A8 1
3250 = 7A7C 8
3260 = 2C0C E
3270 = A309 0
3280 = A6FD 0
3290 = E072 2
3300 = 398A C
3310 = 16D5 A
3320 = C2AC 6
3330 = FF2B A
3340 = BFBD 6
3350 = 9E9C 0
3360 = 99B0 D
3370 = ED0F 6
3380 = DB2E A
3390 = A6FD 7
3400 = C0FA 3
3410 = B411 6
3420 = 2B77 A
3430 = C751 D
3440 = ED0F 3
3450 =  B00 4
3460 = F116 8
3470 = C837 9
3480 = 2EBE 2
3490 = BFBA 7
3500 = B1EA 0
3510 = BFBA 6
3520 = 8F9C B
3530 = 1FE5 7
3540 = 1E67 B
3550 = 66B2 7
3560 = E8A7 9
3570 = 3278 3
3580 = FE55 6
3590 = 29FE 8
3600 = 9831 3
3610 = 3B4F 1
3620 = F097 B
3630 = C971 D
3640 = DA9F 8
3650 = 6D75 8
3660 = 277C 3
3670 = FBA7 F
3680 = A03E E
3690 = ED07 1
3700 = 66B2 5
3710 = B82E 9
3720 = ED0F B
3730 = 4030 5
3740 = 4686 7
3750 = CFF7 F
3760 = 3174 2
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3780 = DC53 4
```

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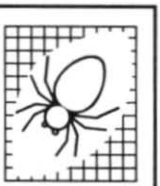

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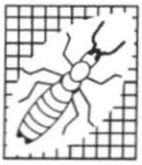

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Get it right!

```
3790 = 5BE0 9  4090 = E001 4  4390 =  96A D  4690 = 993F 0  4990 =  917 F  5290 = 7A16 9
3800 = 3099 2  4100 = ED0F 3  4400 = ED0F D  4700 = 6DCE 4  5000 = 4B13 E  5300 = E44D 4
3810 = C1F4 D  4110 =  AF6 E  4410 = 9B7E 0  4710 = 25E3 0  5010 = 2CFB 7  5310 = C366 F
3820 =  500 4  4120 = 3BB2 D  4420 = C58F 8  4720 = B08F C  5020 = 61D8 6  5320 = 496D E  5590 = F05A B
3830 = 450B F  4130 = 1015 A  4430 = FEF4 D  4730 = E994 A  5030 = B9C1 C  5330 = E20E 8  5600 = F20A A
3840 = 4468 A  4140 = FC1C 1  4440 = 7F88 1  4740 = 2B77 D  5040 = BE1D 5  5340 = C054 4  5610 =  9F6 2
3850 = 4F8D 6  4150 = B464 E  4450 = ED0F C  4750 = 76FD C  5050 = 5DB6 9  5350 = 6DCE 3  5620 = E675 6
3860 = 6DCE B  4160 = C837 B  4460 = CCBC C  4760 = BE1D 0  5060 = 3D12 7  5360 = 496D B  5630 = 2A88 2
3870 = C295 E  4170 = 12E7 4  4470 = A70C F  4770 = 17EB 1  5070 =  4CB E  5370 = 5F07 C  5640 =  9F6 C
3880 = ED0F 1  4180 =  230 2  4480 = FEF4 7  4780 = C837 D  5080 = 8595 2  5380 = 6DCE 2  5650 = ED0F A
3890 = 9B1B D  4190 = BFBA D  4490 = 1D0B 0  4790 = F194 9  5090 = 6DCE 8  5390 = 496D 4  5660 = 9A0F 4
3900 = 88E1 C  4200 = FD8C 6  4500 = 46AE 4  4800 = B1EA B  5100 = EF64 A  5400 = 5E09 9  5670 = 87A1 A
3910 = ED5F 8  4210 = 1AC3 D  4510 = ED0F 3  4810 = BFBA 5  5110 = AE6D F  5410 = 6DCE 1  5680 = C920 5
3920 = AD54 1  4220 = 213E 9  4520 = D084 5  4820 = FD8C 1  5120 = 993F 8  5420 = D44D 2  5690 = DC34 7
3930 = 6DCE 0  4230 = E949 B  4530 = 94E9 1  4830 = 4346 A  5130 = 6DCE 1  5430 = 28C1 D  5700 = 43B7 E
3940 = 1FE5 E  4240 = A82E E  4540 = FEF4 1  4840 = 7CA7 9  5140 = CCD1 1  5440 = 7E75 3  5710 = 903A 6
3950 = 88E1 D  4250 = 59C8 5  4550 = 9578 2  4850 = 82BE C  5150 = F4EA C  5450 = B996 E  5720 = 5C38 7
3960 =  500 E  4260 = 7CA7 B  4560 =  FED 8  4860 = 96AD 2  5160 = 74DB C  5460 = 175E 8  5730 = A597 4
3970 = 450B 2  4270 = 56EF 1  4570 = 2204 E  4870 = 6DCE 4  5170 = C543 D  5470 = 9799 2  5740 = 43A1 A
3980 = FDC6 8  4280 =  F40 3  4580 = ED0F 0  4880 = 9831 D  5180 = 2B77 C  5480 = FF7D F  5750 = ED0F 0
3990 = 3F72 6  4290 = 8AA4 8  4590 = A5EE C  4890 = E949 0  5190 = DF39 8  5490 =  812 5  5760 = 5DE0 5
4000 = ED5F 3  4300 = 8852 6  4600 = D9D7 1  4900 = 7862 B  5200 = ED0F C  5500 = 2355 5  5770 = C5C9 2
4010 = AD54 7  4310 = 1FD6 3  4610 = FEF4 F  4910 = 34AA 1  5210 = B463 D  5510 = 77A9 D  5780 = 8454 3
4020 = 6DCE A  4320 = 9831 7  4620 = 63D0 6  4920 = ADBC 6  5220 = 9170 F  5520 = 6696 C  5790 = 3E6E 0
4030 = 8AA4 4  4330 = F070 F  4630 = F67C 0  4930 = BE73 B  5230 = 2B77 B  5530 = BFBA E  5800 = 57AF 0
4040 = 4D7C F  4340 = 8861 2  4640 = 2204 6  4940 =  684 0  5240 = 56DE A  5540 = AB86 4  5810 = B9AD 3
4050 = A231 1  4350 = 3D74 4  4650 = ED0F 0  4950 = 2CFB B  5250 = FD2E E  5550 = DD29 D  5820 = 10CB 7
4060 = AEF8 D  4360 = 9569 B  4660 = EB71 C  4960 = FFD5 E  5260 = ED0F 2  5560 = ED0F 4  5830 = 11F1 4
4070 = 22E5 4  4370 = 868C 0  4670 = E09A 1  4970 = 4B13 2  5270 = FD2E F  5570 = 6916 E  5840 =
4080 = 6DCE 8  4380 = AB2F 6  4680 = EA6D 9  4980 = 2CFB 5  5280 = 97B2 3  5580 = FB09 B
```

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Beastiroids bug beaten

IN the September issue of The Micro User *there was a letter from Mr. A.E. Gillam who was having trouble typing in one of your programs, Beastiroids, published in June. He had obviously made some error in the extremely complicated Data statements of that program, but the checksums were correct.*

You pointed out to him a place where this might have happened – in line 1320 – where typing a zero instead of a lower case o would get the same checksum value. What, you asked, were the odds against this happening?

I am afraid I have to inform you that this problem does not arise because of some strange fluke upsetting the checksum system. It is the result of a bug in the Get it Right! program itself.

In the Beastiroids program, it is not only typing a zero at the offending position which will leave the checksum unaltered – it will be unchanged whatever character is put there.

In fact you can replace the whole of that line after the \ character by something completely different, and the checksum will still be the same provided only that there is no : character

The source of the problem is a feature of the original checksum program – the way that it ignores comments in assembly language sections.

In line 1290 of Beastiroids there is a [as part of a data statement. This makes the checksum program assume that everything between this and the next] – which as far as I can see is everything in line 1430 – is in assembly language.

The result is that it ignores everything that comes after a \ on any of the lines in between because it assumes that these are assembly language comments.

Unfortunately this means that quite a lot of the data in Beastiroids is not included in the published checksums.

It would be easy enough to get round this bug. All you would need to do would be to have another flag in the checksum program which is set when a data keyword – byte value &DC – is found, and which is cleared at the start of each line. The program could then check this whenever it encountered a [and not treat it as the start of an assembly language section if that flag were set.

Mercifully, you seem to have published very few programs like Beastiroids, which include both [and \ characters in data statements.

For these, altering any single character will always give a different checksum value for the appropriate line, though this could theoretically be left the same if more than one character was changed. – **D. L. Harper, Brinsley, Nottingham.**

- Thanks for your observations. As you say, it's very rare that [and \ occur in data statements, so we feel it's better not to confuse people by changing Get it Right! at the moment.

Venturing into adventures

RECENTLY I bought the GAC – Graphic Adventure Creator – from Incentive and have written what I think is a reasonable game with it. I don't have the resources to market it myself so I'd like to try to sell it but I am not sure how.

I'm also worried about giving it to a company as they might copy it and claim it was theirs. Should I copyright it first? – **P. Tatham, Kirk Ireton, Derbyshire.**

- All well-known companies are quite reputable but to be sure you can always seal a copy of your game in an envelope and lodge it with a bank or solicitor.

Nowadays adventure games companies are very picky about the quality of games they release, but even if yours is not up to their standard they will advise you on how to improve it. Some companies will even pay for an idea rather than a whole game.

Integrated Fontstyle

I FIND Fontstyle an ideal way of printing my documents, but swapping between it and any word processor inconvenient. I have therefore devised the following method to integrate the two.

Add a single line to the FONTPRT program to get a function key to quit the program, enter the word processor and load the file.

The best place for a key to be programmed is during the printing procedure, just after the check that textfile$ *is on the text disc. This is around line 1525 – depending on the version:*

```
1525 PROCoscli("KEY0""*W.
|M2"+textfile$+"|M")
```

To use it just press f0 at the 'Please enter choice' *prompt, and you will end up in Wordwise, with the last printed file loaded. Similar sequences could be used to enter other word processors. The line won't work if you haven't printed a document first.*

To return to FontStyle all you need to do is put a boot file on the text disc, assuming it isn't the system disc and is in drive zero, as follows:

```
*BASIC
*DRIVE 0
CH."FONTPRT"
```

– **M. Jones, Wimbledon, London.**

- If you have a disc drive that only allows booting from drive zero – all Acorn DFSs – you can create a simplified FontStyle print disc by copying the files FONTPRT and M/C plus any fonts on to an empty disc, then using the boot file given above. You can use this disc to write and print your letters only turning to the original disc when you need to design or modify a font.

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- **Want to write to The Micro User? The address is: Letters, The Micro User, Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP.**

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Tape to disc problems

I HAVE been using the tape transfer utility published in the January edition of The Micro User.

When I used it to transfer from tape to disc on a standard BBC Micro it generates the error Bad name at 1500, Press Escape, *when the file has completed loading to*

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disc. What happens is that the load and execution addresses are omitted from the disc catalogue although this can easily be added with a disc editor or by loading the file or program and resaving it to disc.

However when used with a Master every file is saved with the addresses 0000 FFFF 4000, giving each the same length. On the BBC Micro the correct file length was saved but not on the Master.

Is there any way to rectify these errors by amendment of the program? – **J.M. Leggat, Wolverhampton.**

● Unfortunately there were two errors in the published program:

```
  180 IF C%=-6 PROCcmnd
 1490 A%=1:X%=&7E:Y%=0:$&
700=o$
```

The second fault is the one that stops the correct load and execution addresses being written to the disc.

However the problem with the file length is a bug in early versions of the Master DFS which fails to write the correct size to the disc when a file is closed and nothing – short of chip replacement – will cure it.

Room for adventure

RECENTLY I decided to have a go at writing a text adventure in Basic for my Compact. I was aiming high and my dreams were shattered when – having changed from Mode 7 to Mode 1 because I re-defined the comma character – I got the dreaded No room *error.*

I then had an idea: I deleted the line which set Mode 1 and created two different programs, the first was an introduction which set Mode 1 and then loaded the main program. This worked, but when I attempted to list the main program I got No Room *again. Please can you help.* – **Mathew Nash, Fulford, York.**

● There are several points here: Unless you particularly need colour you might as well use Mode 6 which gives you 25 lines of 40 character wide text – and allows you to use defined characters.

At a guess you are not using shadow screen anyway, which would put HIMEM at &8000 regardless of which screen mode is used – but then your program would only work on machines that have the extra screen memory.

In order to store text you ought to compress it to reduce the space needed, and more professional adventures don't hold the the text in DATA statement at all but it is created separately and loaded when needed from disc.

Programming your Z88

IN the September issue of The Micro User *Andrew Moore gives a PROC using the command line interpreter to turn the Z88's keyclick on. A neater way of doing this is to poke the memory directly, especially as this enables you to control not only the keyclick but also the repeat rate and the timeout.*

For those interested the timeout in minutes is a one byte unsigned binary number at &201 and location &202 contains the auto-repeat rate in centiseconds as a one-byte unsigned binary number – zero turns it off altogether. Location &203 contains &59 – Ascii of Y – or &4E – N – according to whether the keyclick is on or off.

Location &200 always contains &FF, and doesn't do anything important, so you can set up all three locations controlling the keyboard with one Basic statement if you use the ! operator like this:

```
KB%=!&200 : !&200=&kkrrmmFF
```

where kk *is either &59 or &4E,* rr *is repeat rate which is normaly &06 and* mm *is timeout normally &05.*

The &FF is just there to make sure location &200 stays as it is – note that the ! operator pokes locations in reverse order. At the end of your program, put this line:

```
!&200=KB%
```

This restores the keyboard options to what they were before so as not to interfere with your other programs.

One use that I've found for these pokes is to turn off the auto-repeat during games. This can be important as the Z88's INKEY function reads the next character in the input buffer. If the repeat isn't turned off during a game, this can fill up making you lose control of your spaceship or whatever as the micro is running several seconds behind you. – **T.D. Lascelles, Portsmouth.**

● Care must be taken if you poke the Z88's memory as, unlike the BBC Micro, you never switch it off to reset your errors and, also, these locations may change in future versions – it's always better to use legal methods.

£10 Prize letter

Keeping in the picture

USERS of Mirrorsoft's Fleet Street Editor will know that the program is a very powerful package, especially the graphics section – Studio – which allows you to create some very impressive displays.

Unfortunately this screen, when printed, is only 1/8 or 1/4 of the page and also it can not be used as an ordinary graphics screen to be loaded into any other package.

The listing shows how the existing program UTILITY on the Fleet Street System Disc can be modified to change a file saved in the Copy Desk – Directory P – into an ordinary graphics screen.

- *Insert the System disc*
- *Type LOAD"UTILITY"*
- *Delete line 40*
- *Delete lines 110 to 180*
- *Delete lines 200 to 210*
- *Delete lines 320 to 470*
- *Delete lines 600 to 610*
- *Delete lines 680 to 920*

Then enter the following lines:

```
   20 VDU 19,0,7;0;19,1,0;
0;
   80 PROCof:PROCw1:PROCw2
:PROCtp:PROCi("",Another (
Y/N)"):A=GETAND&DF
   90 IF A<>89:END
  100 UNTIL0
  275 VDU 26,28,0,30,39,25
,12
  280 OSCLI"SAVE $."+F$+"
5800 7FFF"
  930 DEFPROCret:PROCi("",
" Are you sure (Y/N)"):A=(
GETANDD&DF):IFA<>89THEN940
 1000 PROCw2:VDU 28,2,28,3
,26:REPORT:PRINT ERL
```

You should then change the Fleet Street disc for one of your own and save the program on it. Next you will have to copy the file O.UTIL to your own disc as well because this is accessed by the program.

The modification works on both a BBC B with Basic II and the Master – as long as the

ALL programs printed in this magazine are exact reproduction of listings taken from running programs which have been thoroughly tested.

However, on the rare occasions when mistakes occur corrections are published as a matter of urgency. Should you encounter error messages when you type in a program, they will almost certainly be the result of your own typing mistakes.

Unfortunately we can no longer answer personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in the letters pages.

Converter program has been loaded first.

Machines with Basic I can incorporate the Oscli routine from Micro Memos *on Page 29 of the August issue of* The Micro User .

The following listing will centre the saved picture on screen.

```
10 MODE 4
20 *LOAD screen 5D10
30 *SAVE screen 5800 7FFF
```

– Darren McGuigan, Armagh, Co.Armagh.

FontSave program

In the November issue of The Micro User *I noticed the letter about acquiring the Zarch text font. Unfortunately I couldn't find the actual FontSave program was it somewhere else in the magazine?* – **Dominic Seymour, Springfield, Fife**

● Unfortunately it did get missed from the magazine, here it is in all it's glory:

```
 10REM >$.Utilities.Fon
tSave
 20REM by J.Hornell
 30INPUT"Font filename:
  "F$
 40INPUT"First characte
r:"S%
 50INPUT"Last character
: "E%
 60DIM B% 9
 70X%=OPENOUT F$
 80FOR C%=S% TO E%
 90  ?B%=C%
100  SYS "OS_Word",10,B%
110  BPUT#X%,23
120  FOR J%=0 TO 8
130    BPUT#X%,B%?J%
140    NEXT
150  NEXT
160CLOSE#X%
170OSCLI"SETTYPE "+F$+"
 FF7"
```

Weighing the anchor

THE splendid review of the Mary Rose new software package by Marshall Anderson in the October issue highlights the fact that the reviewer is very much a computer man and not a geographer. When he talks of "Having sailed around Plymouth Sound for a while ..." in the search for the wreck site of The Mary Rose he was indeed fortunate to find anything. He would have more chance if he turned this attentions to the Solent and seabed off Portsmouth. – **Mike Taylor, Trading Director, Mary Rose Trading, Portsmouth.**

Sound solutions

IN THE October Problem Solved Mike Cook mentioned Soundmaster as a device allowing the connection of headphones to a BBC Micro and the adjustment of sound volume.

Could you please let me have some information about the nature, price and compatibility of this device as it sounds exactly what I require? – **John H Mason, Tockington, Bristol.**

● The Sound Master is a small unit that comes complete with headphones and plugs in to the BBC Micro without soldering. A volume control on the unit controls the output to the headphones if they are connected or the micro's speaker if they aren't. It is compatible with all BBC Micros including the Master and is available for £14.99 using the order form on Page 135.

Gem on the Master 512

I HAVE a Solidisk-modified Master 512 which gives me 897k ram with the latest BBC Micro MsDos 2.1 and Gem 2.0. I recently bought Gem 3.0 and other related software. Unfortunately it doesn't work properly.

Although I can load Gem 3.0 there's no mouse driver so I can only use it with the arrow keys. Software such as 1st Word Plus and Superbase which work under Gem 2.0 – though not properly – give no problems under Gem 3.0. I was hoping to buy a copy of Timeworks DTP but as it only works on Gem 3.0 I don't see much point as I won't be able to use the mouse.

I have contacted Digital Research and Acorn but neither were able to help me. I can appreciate the cost involved in supplying a special version of Gem 3.0 to run on the Master 512, but unless I can obtain a modified working version of Gem 3.0 I'll be forced to buy a PC and I feel this would be such a shame as the BBC Micro seems to be a much superior machine.

Is it possible to buy a suitably adapted version of Gem 3.0 to run on the Master 512? – **Rev. G.P. Bridle, Craigavon, Co. Armagh. N.Ireland.**

● Perhaps one of our readers can help – however since 1st Word Plus and other original PC software are now available as native Archimedes programs and you can run other PC packages on the emulator perhaps you should consider upgrading your hardware in this direction.

Close thing

HERE'S a tip for Master Users: If you have several data files open CLOSE #0 does not close them all. If you had done, say, DF1=OPENUP("FRED") and DF2=OPENUP("LUKE") you will have to enter CLOSE#DF1:CLOSE#DF2. – **Tony Boyd, Petworth.**

£10 Prize letter

VUPPY again

HAVING struggled with View's highlights for some time, I was interested to read Peter Harris's article – Join the View Club – in the September issue.

I typed in the listing and was most satisfied with the results. The only problem I found was remembering the printer control codes for features like enlarged or underlined.

I got around this problem by putting the various codes on the shift+control level of the function keys which are not used by View using the following command file:

```
PRINTER VPD  | *KEY 6 W1
*FX 4,1      | *KEY 7 W0
*FX 228,1    | *KEY 8 4
*KEY 0 P     | *KEY 9 5
*KEY 1 (     | *KEY 11 T
*KEY 2 E     | *KEY 12 p0
*KEY 3 F     | *KEY 13 p1
*KEY 4 -1    | *KEY 14 S1
*KEY 5 -0    | *KEY 15 S0
```

Create this file using *BUILD on the same disc and directory as the VUPPY printer driver. At the start of each view session, run the file using *EXEC from the View command screen. The printer driver will be loaded and the Shift+Control+function keys will be configured as follows:

f0	*select standard type*
f1	*select NLQ type*
f2	*emphasised type on*
f3	*emphasised type off*
f4	*underlining on*
f5	*underlining off*
f6	*enlarged type on*
f7	*enlarged type off*
f8	*italics on*
f9	*italics off*
↑	*superscript on*
↓	*subscript on*
Copy	*super/subscript off*
→	*micro spacing on*
←	*micro spacing off*

The value of highlight 1 is changed at the start of the document, using the stored command HT, to 27 – the ESC code. Printer commands can then be utilised by typing a highlight 1 code followed by the appropriate function key.

Obviously there are not enough function keys for all the printer commands available and it is simple to change the definitions for your preferred ones.

The codes used here are for a Canon PW1080A printer which is allegedly Epson-compatible but it is advisable to check the codes for your own printer – **I.D. Lindsay, Newton Abbott, Devon.**

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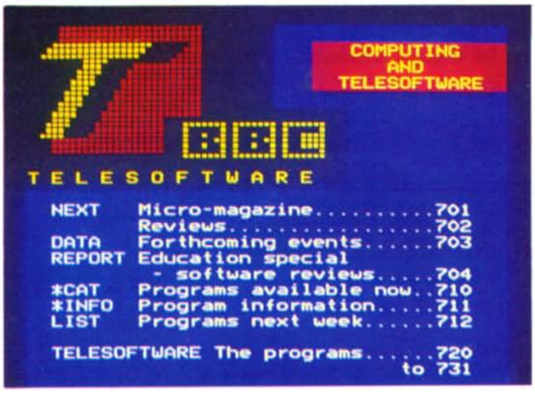

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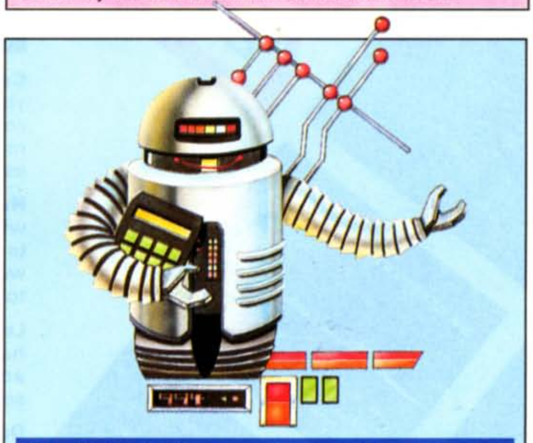

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HUNGRY HARRY
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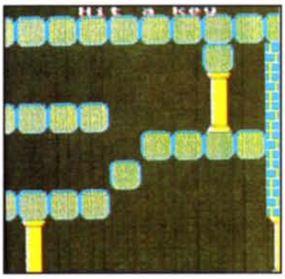

Arcade Game Creator is a suite of programs for the BBC Micro or Electron. Taken from the pages of *Electron User*, it lets you into the secrets of writing fast-action arcade games, and provides you with a number of utilities to make design and programming easier.

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To accompany the Arcade Game Creator we are also making available the six back issues of Electron User (February to July 1988) in which the series appeared. Clearly written without any jargon, they take you step-by-step from the basics of game design, right up to producing fully-fledged programs.

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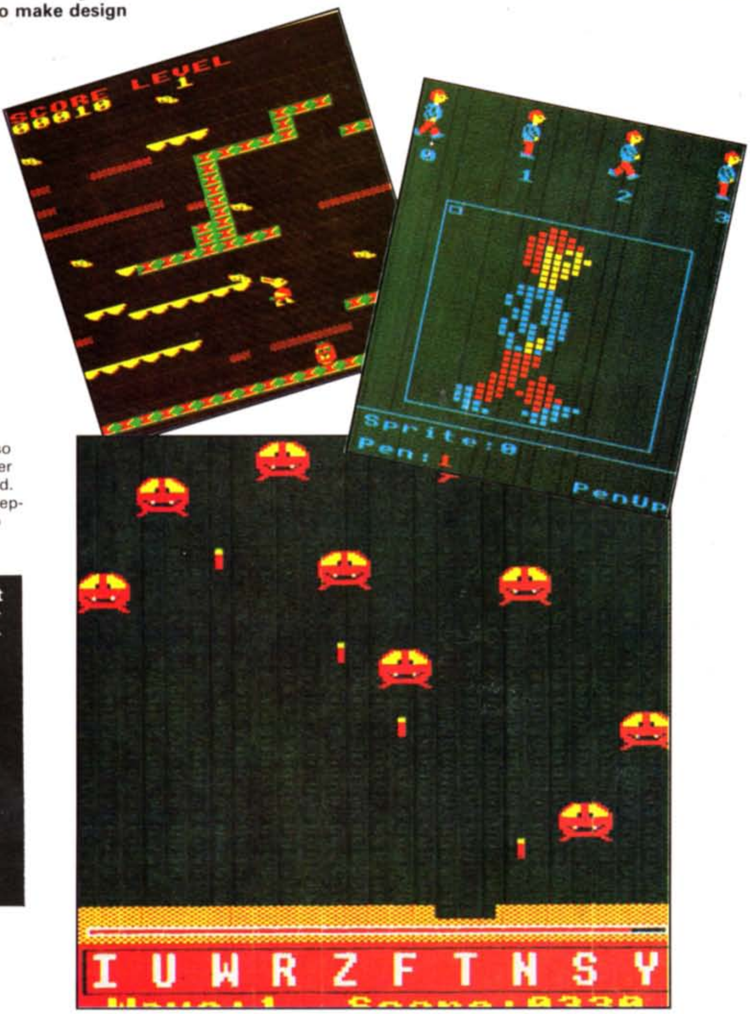

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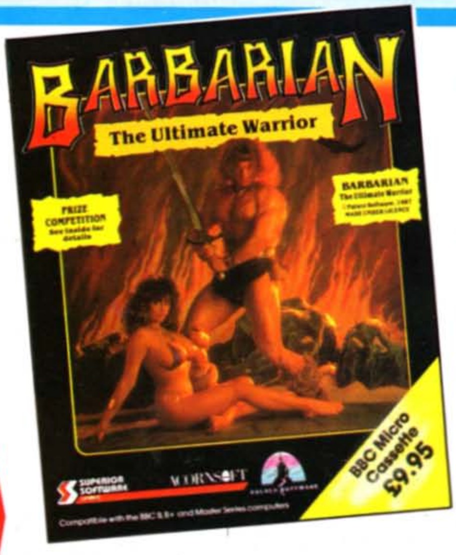
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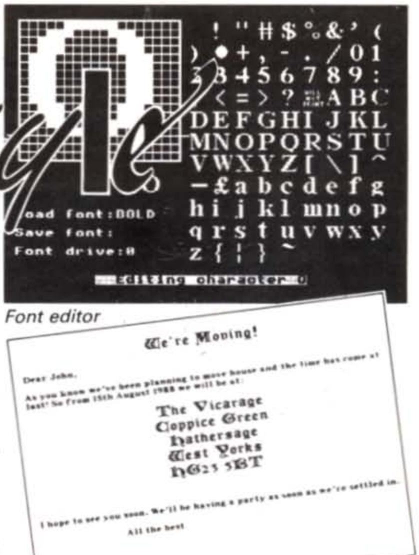

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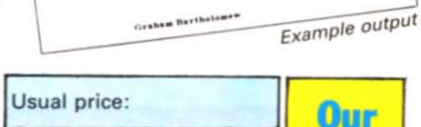

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(see page 133)

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(see page 76)

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(see page 132)

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(see page 69)

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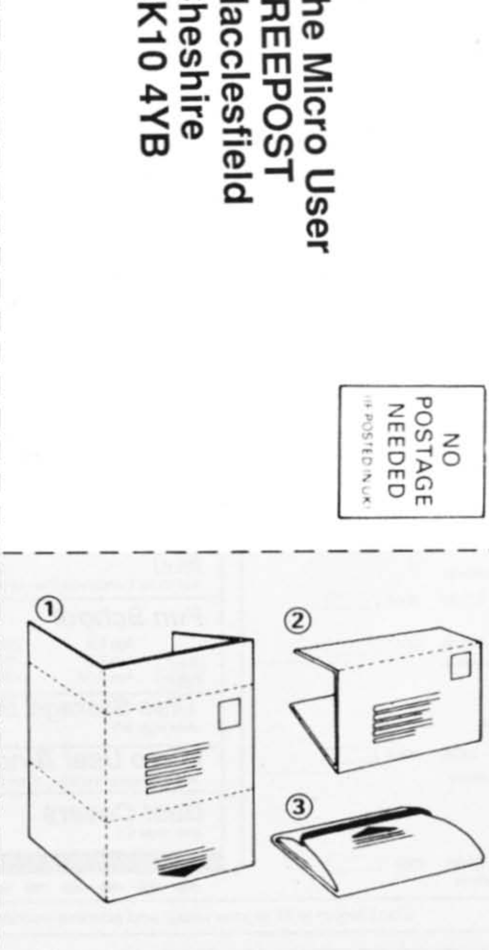

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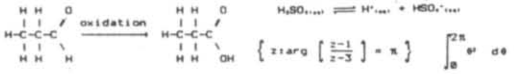

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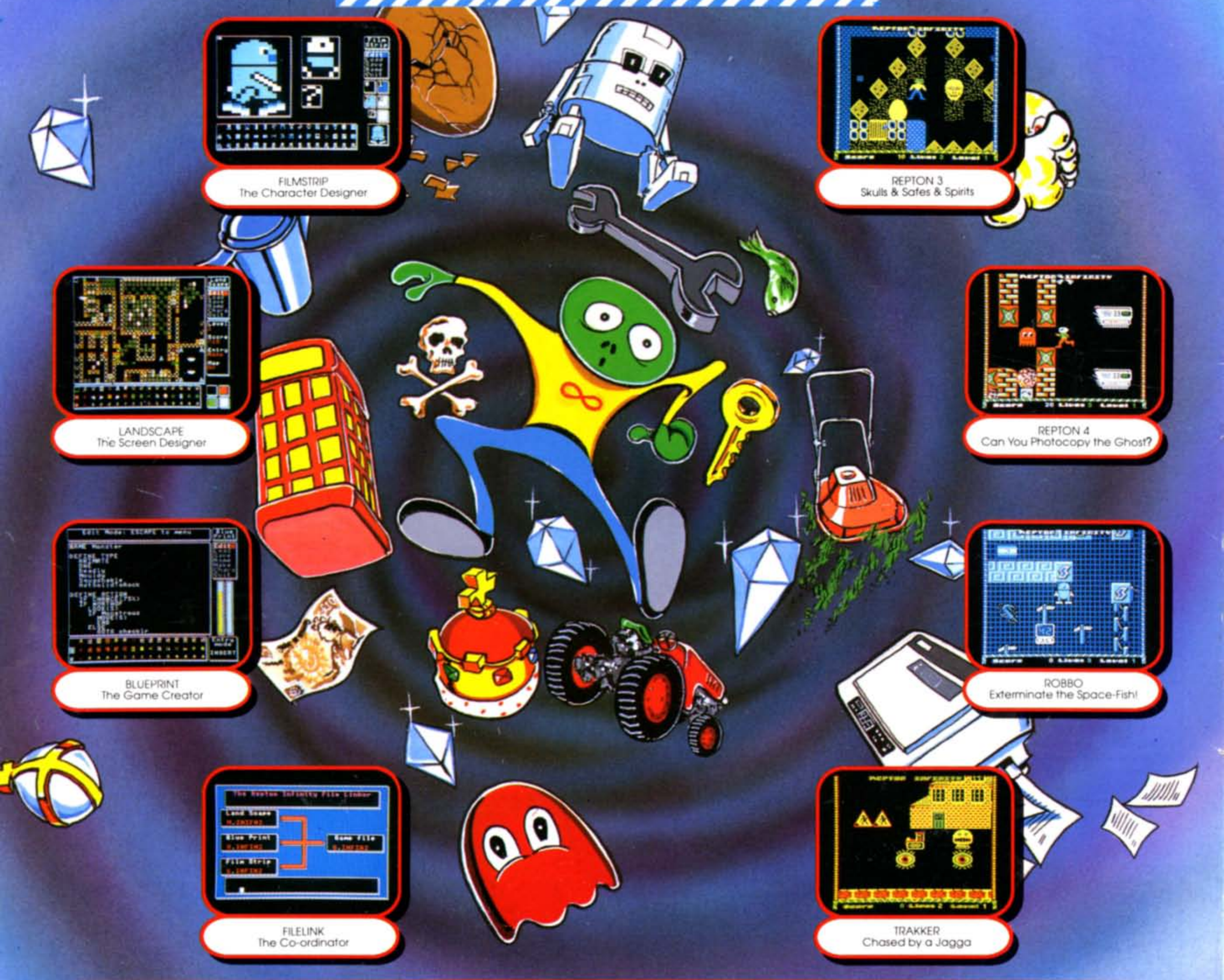

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